bürkert
FLUID CONTROL SYSTEMS

Type 8222
ELEMENT

Conductivity meter
Leitfähigkeits-Messgerät
Conductivimètre

Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

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MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

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1. ABOUT THIS MANUAL 4
1.1. Symbols used 4
1.2. Validity of the manual 4
1.3. Definition of the word “device” 4
2. INTENDED USE 5
2.1. Restraints 5
3. BASIC SAFETY INFORMATION 6
4. GENERAL INFORMATION 8
4.1. Contact 8
4.2. Warranty conditions 8
4.3. Information on the internet 8
5. DESCRIPTION 9
5.1. Area of application 9
5.2. General description 9
5.2.1. Design 9
5.2.2. Conductivity sensor 9
5.3. Description of the name plate 10
5.4. Available versions 10
6. TECHNICAL DATA 12
6.1. Conditions of use 12
6.2. Conformity to standards and directives 12
6.3. General technical data 12
6.3.1. Mechanical data 12
6.3.2. General technical data 15
6.3.3. Sensor specifications 16
6.3.4. Electrical data 16
6.3.5. Data of connectors and cables 17
7. ASSEMBLY 18
7.1. Safety instructions 18
7.2. Unscrewing the cover 18

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

7.3. Mounting the cover 19
7.4. Mounting the display module 19
7.5. Removing the display module 20

8. INSTALLATION 21
8.1. Safety instructions 21
8.2. Installation onto the pipe 22
8.3. Wiring 23
8.3.1. Assembling the male or female connector (accessories: see chap. 11) 23
8.3.2. Equipotentiality of the installation 24
8.3.3. Wiring a version with a single M12 fixed connector 25
8.3.4. Wiring a version with 2 M12 fixed connectors 26

9. OPERATING AND COMMISSIONING 30
9.1. Safety instructions 30
9.2. Operating levels 30
9.3. Using the navigation button 31
9.4. Using the dynamic functions 32
9.5. Example for the input of a numerical value 33
9.6. Example for browsing in a menu 33
9.7. Description of the display 34
9.7.1. Description of icons and LEDs 34
9.7.2. When switching on the device 35
9.8. Read level 35
9.9. Accessing the Settings level 36
9.10. Menu structure of the Settings level 37
9.11. Parameters Menu 40
9.11.1. Transferring data from one device to another 40
9.11.2. Setting the date and time 41
9.11.3. Modifying the PARAM menu access code 41
9.11.4. Restoring the default parameters of the Read level and the outputs 41
9.11.5. Setting the data displayed in the READ level 42
9.11.6. Displaying of the lowest and highest values measured 43
9.11.7. Setting the display contrast and brightness 43

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.11.8. Choosing the output wiring mode 43
9.11.9. Setting the parameters of the current outputs 44
9.11.10. Setting the parameters of the transistor outputs 45
9.11.11. Choosing the type of temperature compensation 46
9.12. Calibration menu 47
9.12.1. Activating/deactivating the Hold function 47
9.12.2. Modifying the Calibration menu access code 48
9.12.3. Adjust the current outputs 48
9.12.4. Calibrating the sensor 48
9.12.5. Entering an offset for the temperature measurement 52
9.13. Diagnostic menu 52
9.13.1. Modifying the Diagnostic menu access code 52
9.13.2. Monitoring the fluid conductivity 52
9.13.3. Monitoring the polarisation slope 53
9.13.4. Monitoring the fluid temperature 54
9.14. Test menu 55
9.14.1. Modifying the Test menu access code 55
9.14.2. Checking the outputs functions 55
9.14.3. Checking the outputs behaviour 55
9.15. Information menu 56
9.15.1. Reading the cause of events linked to icons 56
9.15.2. Reading the software versions 56
10. MAINTENANCE AND TROUBLESHOOTING 57
10.1. Safety instructions 57
10.2. Cleaning of the transmitter 57
10.3. If you encounter problems 58
11. ACCESSORIES 62
12. PACKAGING, TRANSPORT 62
13. STORAGE 62
14. DISPOSAL OF THE PRODUCT 63

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

1. ABOUT THIS MANUAL

This manual describes the entire life cycle of the device. Please keep this manual in a safe place, accessible to all users and any new owners.

This manual contains important safety information.

Failure to comply with these instructions can lead to hazardous situations.

- This manual must be read and understood.

1.1. Symbols used

DANGER

Warns you against an imminent danger.

- Failure to observe this warning can result in death or in serious injury.

WARNING

Warns you against a potentially dangerous situation.

- Failure to observe this warning can result in serious injury or even death.

CAUTION

Warns you against a possible risk.

- Failure to observe this warning can result in substantial or minor injuries.

NOTE

Warns you against material damage.

- Failure to observe this warning may result in damage to the device or system.

Indicates additional information, advice or important recommendations.

Refers to information contained in this manual or in other documents.

→ Indicates a procedure to be carried out.

1.2. Validity of the manual

The manual describes the devices from V2 software version of the acquisition / conversion module for the measured process values.

Check this sofware version on the device in the menu Info -> Software -> Versions -> Main.

1.3. Definition of the word “device”

The word “device” used within this Quickstart refers to the conductivity meter type 8222 ELEMENT.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

2. INTENDED USE

Use of the conductivity transmitter that does not comply with the instructions could present risks to people, nearby installations and the environment.

- The 8222 transmitter is intended for the measurement of the conductivity.
- This device must be protected against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of climatic conditions.
- This device must be used in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in the user manual.
- Requirements for the safe and proper operation of the device are proper transport, storage and installation, as well as careful operation and maintenance.
- Only use the device as intended.

2.1. Restraints

Observe any existing restraints when the device is exported.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

3. BASIC SAFETY INFORMATION

This safety information does not take into account:

- any contingencies or occurrences that may arise during assembly, use and maintenance of the device.
- the local safety regulations that the operator must ensure the staff in charge of installation and maintenance observe.

Danger due to high pressure in the installation.

- Stop the circulation of fluid, cut off the pressure and drain the pipe before loosening the process connections.

Danger due to electrical voltage.

- Shut down and isolate the electrical power source before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

Danger due to high fluid temperatures.

- Use safety gloves to handle the device.
- Stop the circulation of fluid and drain the pipe before loosening the process connections.

Danger due to the nature of the fluid.

- Respect the regulations on accident prevention and safety relating to the use of aggressive fluids.

Various dangerous situations.

To avoid injury take care:

- to prevent any unintentional power supply switch-on.
- to carry out the installation and maintenance work by qualified and skilled staff with the appropriate tools.
- to guarantee a set or controlled restarting of the process after a power supply interruption.
- to use the device only if in perfect working order and in compliance with the instructions provided in the user manual.
- to observe the general technical rules during the planning and use of the device.
- not to use this device in explosive atmospheres.
- not to use this device in an environment incompatible with the materials from which it is made.
- not to make any external modifications to the device. Do not paint or varnish any part of the device.
- not to use fluid that is incompatible with the materials of which the transmitter is made.
- not to subject the device to mechanical loads (e.g. by placing objects on top of it or by using it as a step).

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

NOTE

Chemical compatibility of materials in contact with the fluid.

- Systematically check the chemical compatibility of the component materials of the transmitter and the fluids likely to come into contact with it (for example: alcohols, strong or concentrated acids, aldehydes, alkaline compounds, esters, aliphatic compounds, ketones, halogenated aromatics or hydrocarbons, oxidants and chlorinated agents).

NOTE

Elements / Components sensitive to electrostatic discharges

- This device contains electronic components sensitive to electrostatic discharges. They may be damaged if they are touched by an electrostatically charged person or object. In the worst case scenario, these components are instantly destroyed or go out of order as soon as they are activated.
- To minimise or even avoid all damage due to an electrostatic discharge, take all the precautions described in the EN 61340-5-1 and 5-2 norms.
- Also ensure that you do not touch any of the live electrical components.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

4. GENERAL INFORMATION

4.1. Contact

To contact the manufacturer of the device use following address:

Bürkert SAS

Rue du Giessen

BP 21

F-67220 TRIEMBACH-AU-VAL

The addresses of our international branches can be found on the Internet at: www.burkert.com

4.2. Warranty conditions

The condition governing the legal warranty is the conforming use of the 8222 in observance of the operating conditions specified in this manual.

4.3. Information on the internet

You can find the user manuals and technical data sheets regarding the type 8222 at: www.burkert.com

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

5. DESCRIPTION

5.1. Area of application

The 8222 transmitter is intended for the measurement of the conductivity. Thanks to two fully adjustable transistor outputs, the transmitter can be used to switch a solenoid valve, activate an alarm and, thanks to one or two 4-20 mA current outputs, establish one or two control loops.

5.2. General description

5.2.1. Design

The 8222 transmitter comprises:

- A sensor for measuring physical parameters, comprising:
  - 2 electrodes which measure an impedance in Ohm
  - a Pt1000 temperature probe measuring a resistance.
- An acquisition / conversion module for the process values measured:
  - acquisition of the impedance measured in Ohm
  - conversion of the measured impedance into conductivity units
  - acquisition of the resistance measured and conversion into temperature
- A display module with browse button used to read and/or configure the parameters of the device. The display module is available as an accessory.

One version of the 8222 transmitter with 2 transistor outputs and a 4-20 mA output operates on a 2-wire system and requires a power supply of 14-36 V DC. For such a version, electrical connection is done via an M12, 5-point, male fixed connector.

One version of the 8222 transmitter with 2 transistor outputs and two 4-20 mA outputs operates on a 3-wire system and requires a power supply of 12-36 V DC. For such a version, electrical connection is done via an M12, 5-point, male fixed connector and an M12, 5-point, female fixed connector.

5.2.2. Conductivity sensor

The transmitter 8222 is fitted with a sensor measuring the conductivity. The sensor is pined together with the electronic module and cannot be dismantled.

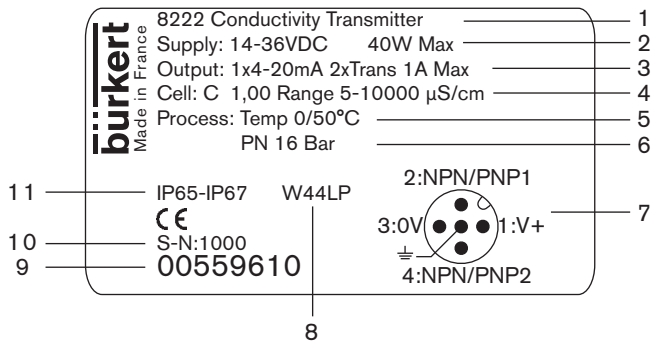
The sensor itself comprises a Pt1000 temperature probe and 2 electrodes (in stainless steel for sensors with a C constant of 0.01 or 0.1, in graphite for sensors with a C constant of 1.0).

The conductivity of a fluid is the capacity of this fluid to conduct electrical current thanks to the ions in the fluid.

An alternating voltage is applied to the electrode terminals: the current measured is directly proportional to the conductivity of the solution.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

5.3. Description of the name plate



1. Type of transmitter and parameter measured
2. Electrical power supply and power consumption
3. Output specifications
4. Cell constant and measuring range of the conductivity
5. Temperature range of the fluid
6. Nominal pressure of the fluid
7. Allocation of the pins on the M12 fixed connectors
8. Construction code
9. Order code
10. Serial number
11. Protection rating

Fig. 1: Name plate of the 8222 transmitter

5.4. Available versions

The following versions of the 8222 conductivity transmitter are available. These references include the electronic module and the conductivity sensor. The display module is available as an accessory. See chapter 11.

Voltage supply	Outputs	Electrical connection	Cell constant	Nut material	UL	Order code
14-36 V DC	2 transistors + 1 x 4-20 mA	Male 5-pin M12 fixed connector	C=1	PVC	no	**559610**
					yes	**559638**
				PVDF	no	**559612**
					yes	**559622**
			C=0.1	PVC	no	**559614**
					yes	**559624**
				PVDF	no	**559616**
					yes	**559626**
			C=0.01	PVC	no	**559618**
					yes	**562394**
				PVDF	no	**559620**
					yes	**562396**

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Voltage supply	Outputs	Electrical connection	Cell constant	Nut material	UL	Order code
12-36 V DC	2 transistors + 2 x 4-20 mA	Male 5-pin M12 fixed connector + female 5-pin M12 fixed connector	C=1	PVC	no	**559611**
					yes	**559639**
				PVDF	no	**559613**
					yes	**559623**
			C=0.1	PVC	no	**559615**
					yes	**559625**
				PVDF	no	**559617**
					yes	**559627**
			C=0.01	PVC	no	**559619**
					yes	**562395**
				PVDF	no	**559621**
					yes	**562397**

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

6. TECHNICAL DATA

6.1. Conditions of use

Ambient temperature	-10 to +60 °C
Air humidity	< 85 %, non condensated
Protection rating	IP65 and IP67 with connectors plugged in and tightened and electronic module cover fully screwed down

6.2. Conformity to standards and directives

The device conforms to the CE directives through the following standards:

- EMC: EN 61000-6-2, EN 61000-6-3
- Vibration: EN 60068-2-6
- Shock: EN 60068-2-27
- Pressure: complying with article 3 of §3 from 97/23/CE directive. Acc. to the 97/23/CE pressure directive, the device can only be used in the following cases (depending on max. pressure, pipe diameter and fluid):

Type of fluid	Conditions
Fluid group 1, §1.3.a	only DN25
Fluid group 2, § 1.3.a	DN ≤ 32 or DN > 32 and PNxDN ≤ 1000
Fluid group 1, § 1.3.b	DN ≤ 25 or DN > 25 and PNxDN ≤ 2000
Fluid group 2, § 1.3.b	DN ≤ 125

The UL devices conform to the following standards:

- UL 61010-1
- CAN/CSA-C22.2 n° 61010-1

6.3. General technical data

6.3.1. Mechanical data

Part	Material
Box / seals	stainless steel 1.4561, PPS / EPDM
Cover / seal	PC / EPDM
Display module	PC / PBT
M12 fixed connector	nickel-plated brass
Fixed connector holder	stainless steel 1.4404 (316L)

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Part	Material
Screws	stainless steel
Tightening nut	PVC or PVDF
Conductivity sensor	PVDF (in contact with the fluid)
Pt1000	stainless steel 1.4571 (316Ti) (in contact with the fluid)
Electrodes ▪ sensor C=1 ▪ sensor C=0.1 or C=0.01	 ▪ graphite ▪ stainless steel 1.4571 (316Ti)

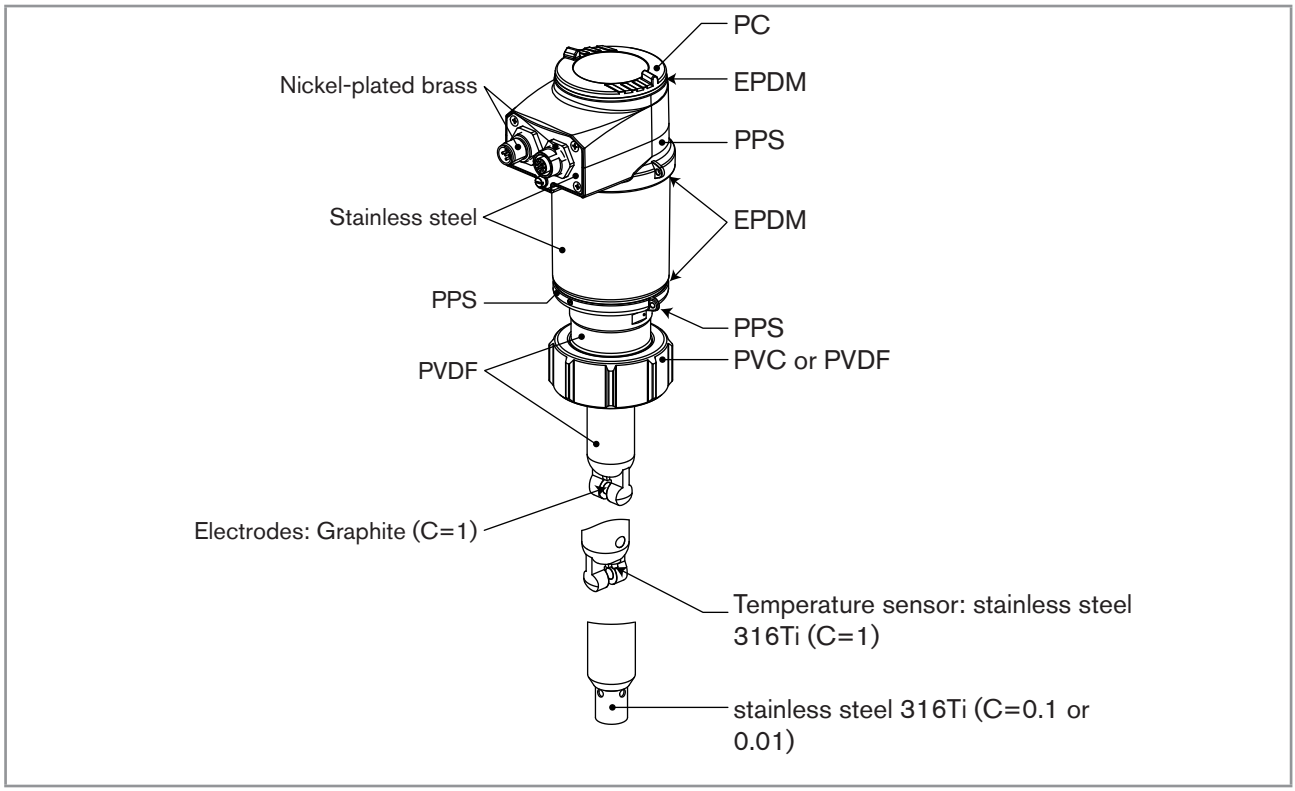


Fig. 2: Materials used in the 8222 transmitter

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

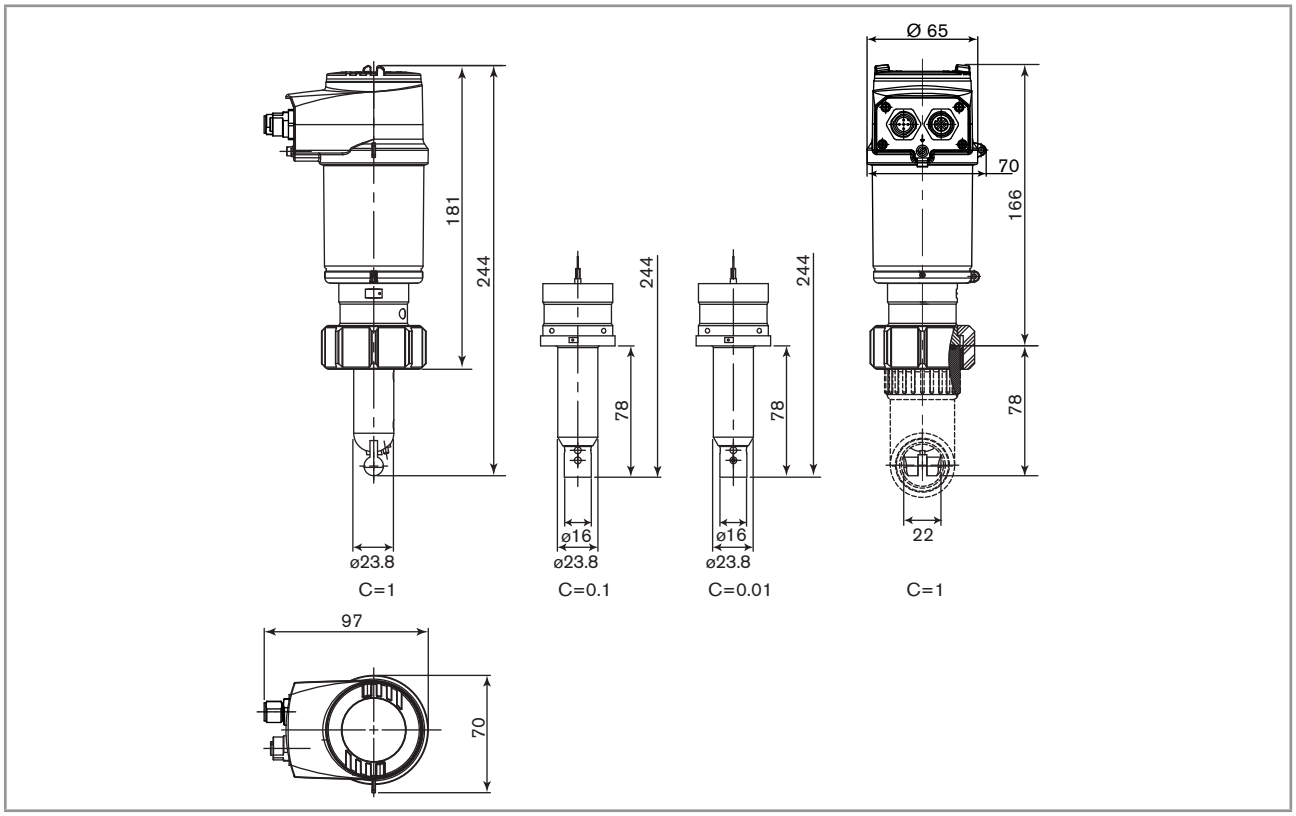
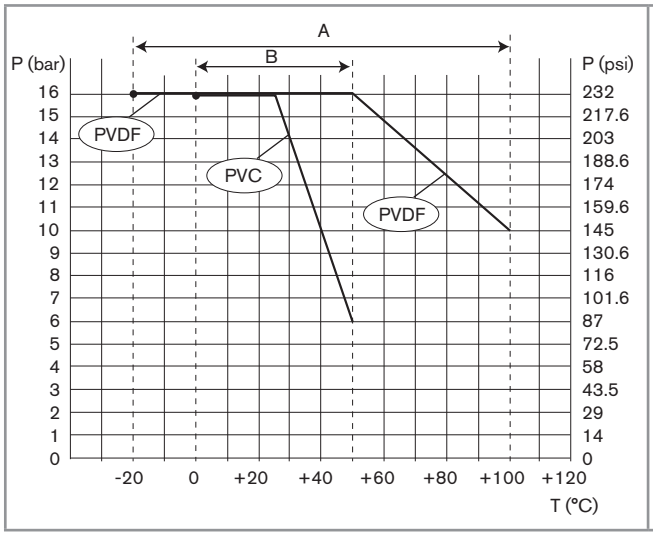


Fig. 3: Dimensions of transmitter 8222 [mm]



- A: application range of a 8222 with a PVDF nut
- B: application range of a 8222 with a PVC nut

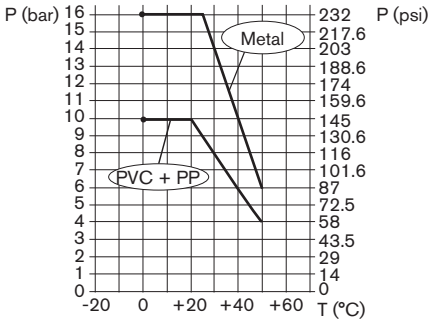
The measures have been made at an ambient temperature of 60 °C

P = Fluid pressure

T = Fluid temperature

Fig. 4: Fluid temperature / pressure dependency of the 8222 with a PVC or PVDF nut

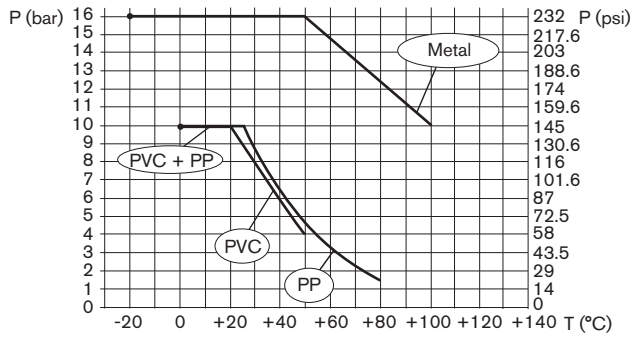
MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015



P = Fluid pressure

T = Fluid temperature

Fig. 5: Fluid temperature / pressure dependency of the 8222 with a PVC nut and a metal, PVC or PP S022 adapter.



P = Fluid pressure

T = Fluid temperature

Fig. 6: Fluid temperature / pressure dependency of the 8222 with a PVDF nut and a metal, PVC or PP S022 adapter.

6.3.2. General technical data

Pipe diameter	DN25 to DN110 (DN15 to DN20 under specific conditions)
Type of fitting	Adapter S022
Nut between the 8222 and the fitting	G 1 1/2" internal thread
Max. fluid temperature ▪ with a PVDF nut (see Fig. 4 and Fig. 6) ▪ with a PVC nut (see Fig. 4 and Fig. 5)	The fluid temperature may be restricted by the pressure of the fluid and the material of the S022 adapter ▪ -20 to +100 °C ▪ 0 to +50 °C
Max. fluid pressure	PN16 The fluid pressure may be restricted by the temperature of the fluid and the material of the adapter S022 (see Fig. 4, Fig. 5 and Fig. 6)

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Conductivity measurement ▪ Measurement range ▪ Resolution ▪ Measuring error ▪ Recommended min. divergence of the conductivity range associated to the 4-20 mA signal	 ▪ 0,05 µS/cm to 10 mS/cm ▪ 1 nS/cm ▪ ±3 % of the measured value ▪ 2 % of the full scale (e.g. for the sensor with C=0.1: range from 100 to 104 µS corresponds to the 4-20 mA output current)
Temperature probe	Pt1000 integrated in the conductivity sensor
Temperature measurement ▪ Measurement range ▪ Resolution ▪ Measuring error ▪ Recommended min. divergence of the temperature range associated to the 4-20 mA signal	 ▪ -40 °C to +130 °C ▪ 0.1 °C ▪ ±1 °C ▪ 10 °C (e.g. range 10 to 20 °C corresponds to the 4-20 mA output current)
Temperature compensation	▪ none ▪ or according to a predefined graph (NaCl or ultra pure water) ▪ or according to a graph defined especially for your process

6.3.3. Sensor specifications

Conductivity sensor C=0.01 ▪ Measurement range ▪ Type of fluid	 ▪ 0.05 µS/cm to 20 µS/cm ▪ ultra-pure water, pure water
Conductivity sensor C=0.1 ▪ Measurement range ▪ Type of fluid	 ▪ 0.5 µS/cm to 200 µS/cm ▪ pure water, industrial wastewater
Conductivity sensor C=1 ▪ Measurement range ▪ Type of fluid	 ▪ 5 µS/cm to 10 mS/cm ▪ industrial wastewater, wastewater

6.3.4. Electrical data

Power supply ▪ Version with 3 outputs ▪ Version with 4 outputs	 ▪ 14-36 V DC, filtered and regulated ▪ 12-36 V DC, filtered and regulated

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Characteristics of the power source (not supplied) of the UL versions	▪ limited energy source (in accordance to UL 61010-1, paragraph 9.3) ▪ or Class 2 source (in accordance to standards 1310/1585 and 60950-1)
Current consumption ▪ Version with 3 outputs ▪ Version with 4 outputs	 ▪ 25 mA max. (at 14 V DC) ▪ 5 mA max. (at 12 V DC)
Current consumption, with loads on the transistors	1 A max.
Power consumption	40 W max.
Protection against polarity reversal	yes
Protection against voltage spikes	yes
Protection against short circuits	yes, transistor outputs
Transistor output	NPN (/sink) or PNP (/source) (depending on software setting), open collector, 700 mA max., 0.5 A max. per transistor if both transistor outputs are wired. NPN output: 0.2-36 V DC PNP output: supply voltage
Current output ▪ Response time (10 % - 90 %) ▪ Version with 1 current output ▪ Version with 2 current outputs	4-20 mA, sink ("NPN sink") or source ("PNP source") (depending on software setting) ▪ 150 ms (default value) ▪ max. loop impedance: 1100 Ω at 36 V DC, 610 Ω at 24 V DC, 180 Ω at 14 V DC ▪ max. loop impedance: 1100 Ω at 36 V DC, 610 Ω at 24 V DC, 100 Ω at 12 V DC

6.3.5. Data of connectors and cables

Number of fixed connectors	Type of connector
1 male M12 fixed connector	5-pin female M12 connector (not supplied). For the M12 connector with order code 917116, use a shielded cable: ▪ diameter: 3 to 6.5 mm ▪ wire cross section: max. 0.75 mm^2
1 male M12 fixed connector and 1 female M12 fixed connector	5-pin female M12 connector (not supplied) and 5-pin male M12 connector (not supplied). For the M12 connector with order code 917116, use a shielded cable: ▪ diameter: 3 to 6.5 mm ▪ wire cross section: max. 0.75 mm^2

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

7. ASSEMBLY

7.1. Safety instructions

WARNING

Risk of injury due to non-conforming assembly.

- The device must only be assembled by qualified and skilled staff with the appropriate tools.

Risk of injury due to unintentional switch on of power supply or uncontrolled restarting of the installation.

- Avoid unintentional activation of the installation.
- Guarantee a set or controlled restarting of the process subsequent to any intervention on the device.

7.2. Unscrewing the cover

NOTE

The tightness of the transmitter is not guaranteed when the cover is removed.

- Prevent the projection of liquid inside the housing.

The transmitter may be damaged if a metal component comes into contact with the electronics.

- Prevent contact of the electronics with a metal component (screwdriver, for example).

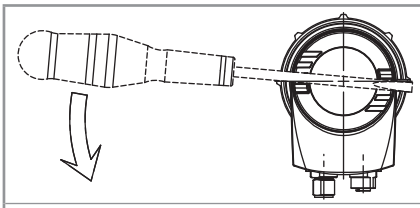
	→ To unscrew the cover, use your hand or a tool which can be used as a lever, taking care not to scratch the glass.
	→ Turn the cover until fully unscrewed.

Fig. 7: Unscrewing the cover

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

7.3. Mounting the cover

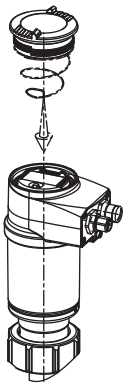
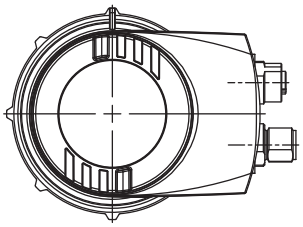
	→ Check that there is a seal on the cover and that it is not damaged. Replace it if necessary. → Grease the seal if necessary, using a component compatible with the seal material.
	→ Fully tighten by hand to guarantee tightness.

Fig. 8: Mounting the cover

7.4. Mounting the display module

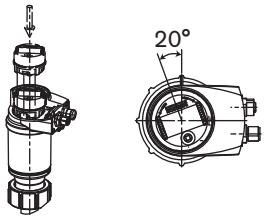
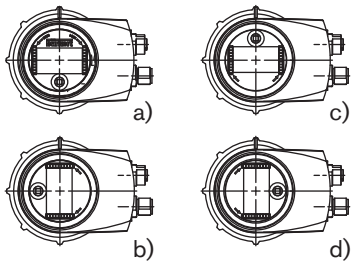
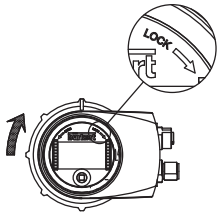
	→ Unscrew the cover (see chap. 7.2). → Set the display module at an angle of ca. 20° in relation to the desired position.
	→ The module can be fitted in 4 different positions, at 90° intervals.
	→ Fully push in the module and turn to the right to lock it.

Fig. 9: Mounting the display module

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

7.5. Removing the display module

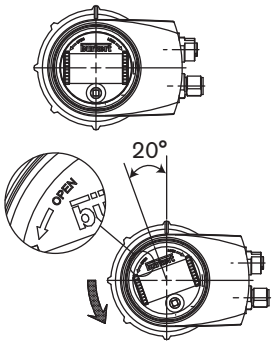
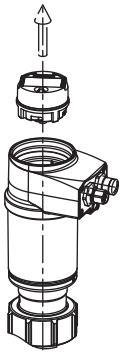
	→ Unscrew the cover (see chap. 7.2). → Turn the module by ca. 20° to the left. Once unlocked, the module is raised slightly by the spring action.
	→ Remove the module from its housing.

Fig. 10: Removing the display module

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

8. INSTALLATION

8.1. Safety instructions

DANGER

Risk of injury due to high pressure in the installation.

- Stop the circulation of fluid, cut off the pressure and drain the pipe before loosening the process connections.

Risk of injury due to electrical voltage.

- Shut down and isolate the electrical power source before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to high fluid temperatures.

- Use safety gloves to handle the device.
- Stop the circulation of fluid and drain the pipe before loosening the process connections.

Risk of injury due to the nature of the fluid.

- Respect the regulations on accident prevention and safety relating to the use of aggressive fluids.

WARNING

Risk of injury due to non-conforming installation.

- The electrical and fluid installation can only be carried out by qualified and skilled staff with the appropriate tools.
- Install appropriate safety devices (correctly rated fuse and/or circuit-breaker).
- Respect the assembly instructions for the fitting used.

Risk of injury due to unintentional switch on of power supply or uncontrolled restarting of the installation.

- Avoid unintentional activation of the installation.
- Guarantee a set or controlled restarting of the process subsequent to any intervention on the device.

Protect this device against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of the climatic conditions.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

8.2. Installation onto the pipe

DANGER

Risk of injury due to high pressure in the installation.

- Stop the circulation of fluid, cut off the pressure and drain the pipe before loosening the process connections.

Risk of injury due to the nature of the fluid.

- Respect the regulations on accident prevention and safety relating to the use of aggressive fluids.

The 8222 transmitter is inserted into a fitting installed on the pipe.

→ Select an appropriate position on the pipe (prefer “A” mounting to install a 8222 with sensor C=0.1 or C=0.01).

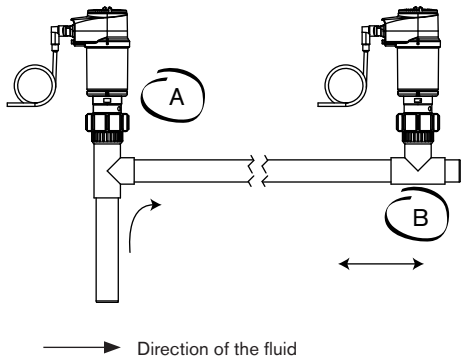
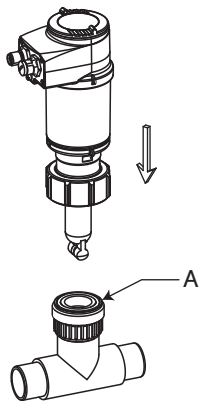


Fig. 11: Mounting positions in the pipe

→ Mount the display module (see chap. 7.4) to calibrate and adjust the transmitter.

→ Calibrate the transmitter (see chap. 9.12.4).

→ Mount the transmitter into the fitting, as shown in Fig. 12:



→ Check that seal "A" is set on the cover and that it is not damaged. Replace the seal if necessary.

→ Carefully insert the transmitter into the fitting.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

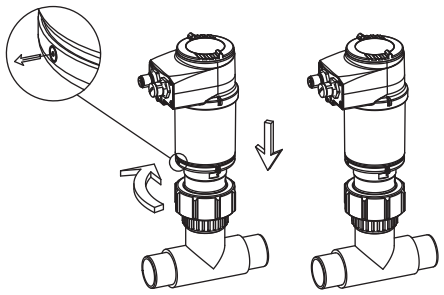
	→ Position the transmitter in such a way that the markings located on either side of the electronics box are parallel to the pipe. → Tighten the nut on the fitting.

Fig. 12: Installation into a fitting

8.3. Wiring

DANGER

Risk of injury due to electrical voltage.

- Shut down and isolate the electrical power source before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

- **Use a high quality electrical power supply (filtered and regulated).**
- **Make sure the installation is equipotential. See chap. 8.3.2.**

8.3.1. Assembling the male or female connector (accessories: see chap. 11)

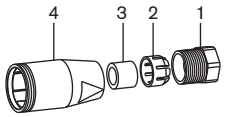
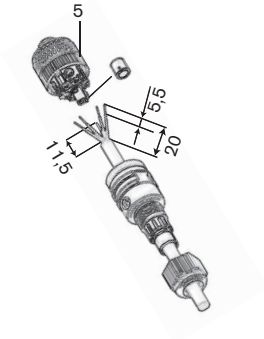
	→ Unscrew the nut [1] on the body [4]. → Insert the cable into the nut [1], the cable clamp [2] and the seal [3], and then into the body [4].
	→ Strip 20 mm of the cable. → Cut the central wire (earth) so that its length is equal to 11.5 mm. → Expose 5.5 mm of the wires on the stripped cable. → Insert each wire into the appropriate pin on the terminal block [5] (see chap. 8.3.3 or 8.3.4). → Tighten the terminal block [5] wired to the body [4]. → Tighten the connector nut [1].

Fig. 13: M12 multi-pin connector (not provided)

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

8.3.2. Equipotentiality of the installation

To ensure the equipotentiality of the installation (power supply - device - medium):

→ Connect together the various earth spots in the installation to eliminate the potential differences that may occur between different earthes.

→ Observe faultless grounding of the shield of the power supply cable.

→ Special attention has to be paid if the device is installed on plastic pipes because there is no direct earthing possible. Proper earthing is performed by earthing together the metallic devices such as pumps or valves, that are as close as possible to the device.

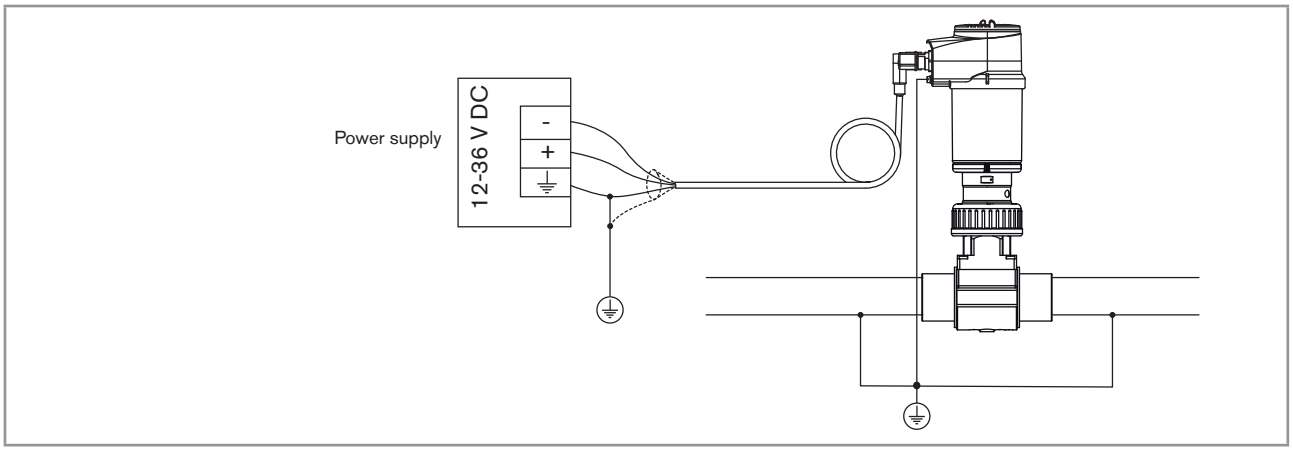


Fig. 14: Equipotentiality skeleton diagram with pipes in metal

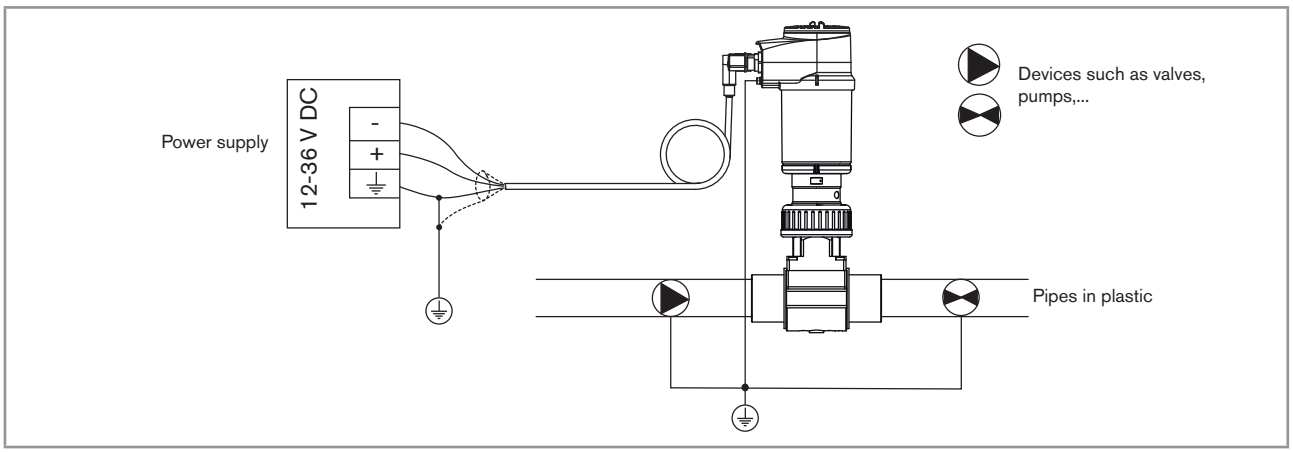


Fig. 1 : Equipotentiality skeleton diagram with pipes in plastic

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

8.3.3. Wiring a version with a single M12 fixed connector

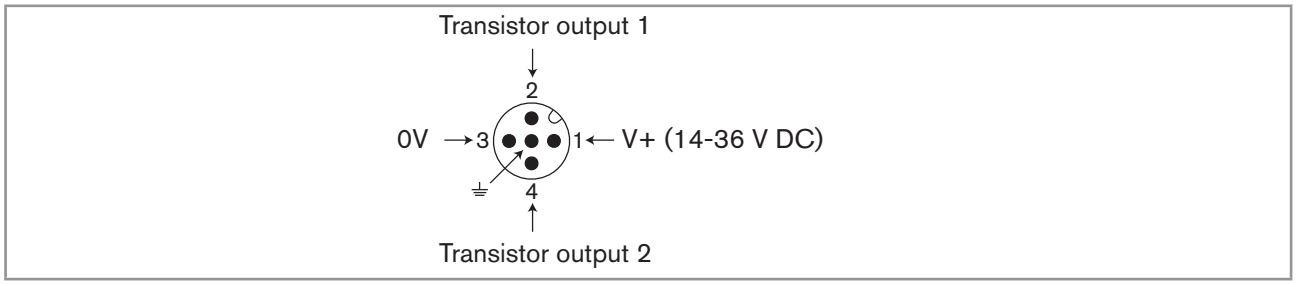


Fig. 15: Pin assignment of the male fixed connector on a version with a single male M12 fixed connector

Pin of the M12 female cable available as an accessory (order code 438680)	Colour of the wire
1	brown
2	white
3	blue
4	black
5	grey

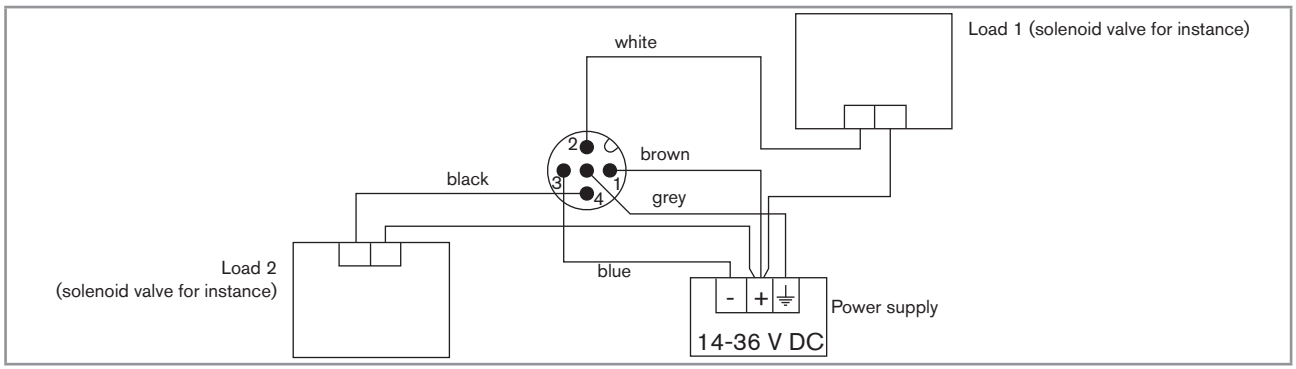


Fig. 16: NPN wiring of both transistor outputs (software setting «NPN/sink», see chap. 9.11.8), on a version with 1 fixed connector

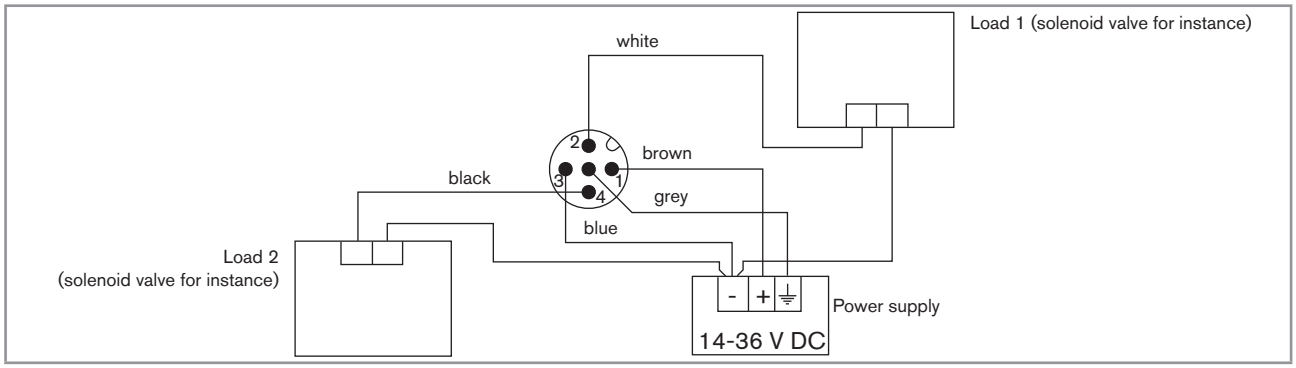


Fig. 17: PNP wiring of both transistor outputs (software setting «PNP/source», see chap. 9.11.8), on a version with 1 fixed connector

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

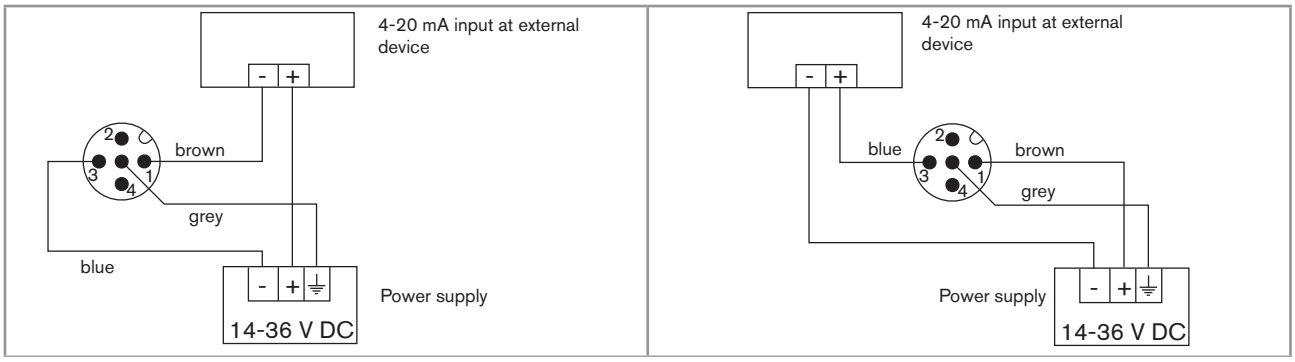


Fig. 18: Possible connections of the current output (whatever the software setting, «NPN/sink» or «PNP/source», see chap. 9.11.8), on a version with 1 fixed connector

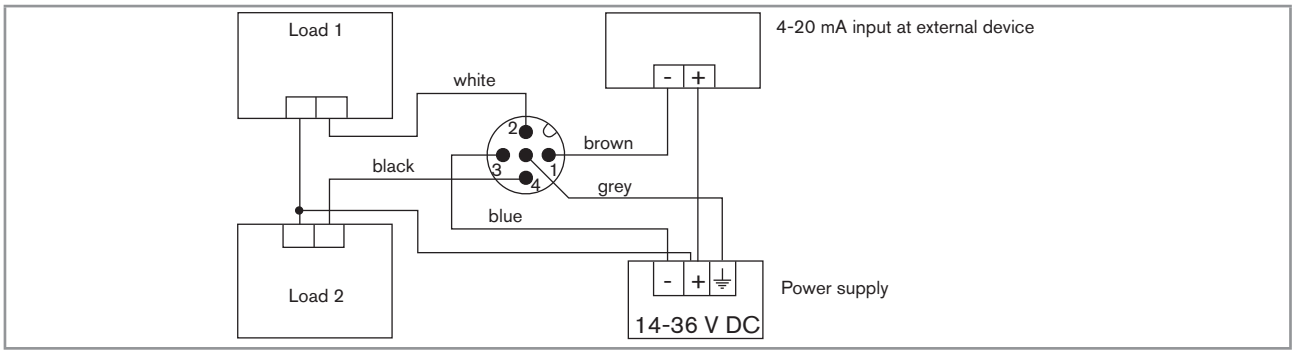


Fig. 19: NPN wiring of both transistor outputs and wiring of the current output in sinking mode (software setting «NPN/sink», see chap. 9.11.8), on a version with 1 fixed connector

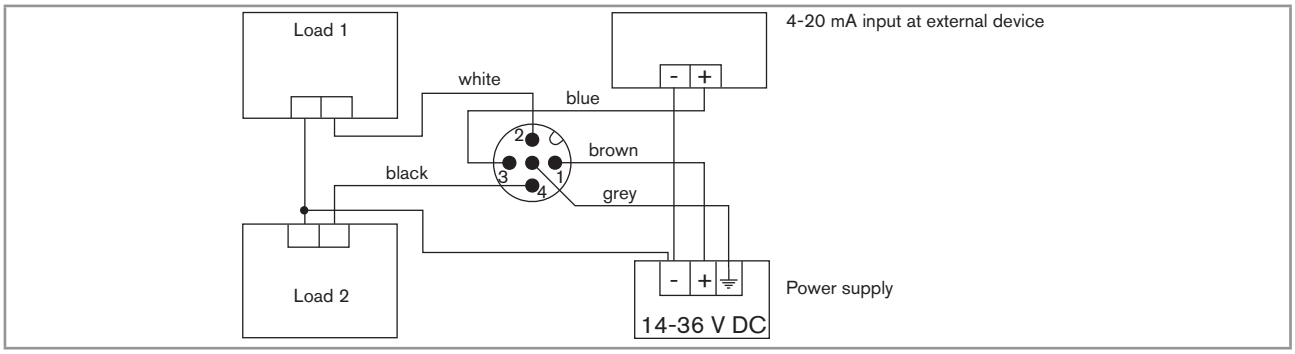


Fig. 20: PNP wiring of both transistor outputs and wiring of the current output in sourcing mode (software setting «PNP/source», see chap. 9.11.8), on a version with 1 fixed connector

8.3.4. Wiring a version with 2 M12 fixed connectors

Fig. 21: Pin assignment of the male and female M12 fixed connectors

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Connect the power supply for the transmitter to the male fixed connector; the supply is then transferred internally to pins 1 and 3 of the female fixed connector in order to ease wiring of the load to the female fixed connector.

Pin of the M12 female cable available as an accessory (order code 438680)	Colour of the wire
1	brown
2	white
3	blue
4	black
5	grey

Pin of the M12 male cable available as an accessory (order code 559177)	Colour of the wire
1	brown
2	white
3	blue
4	black
5	grey

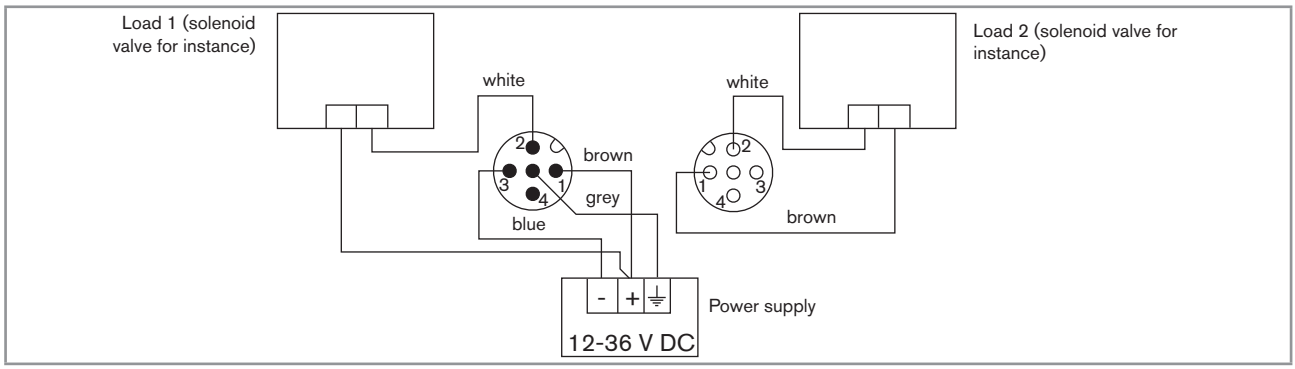


Fig. 22: NPN wiring of both transistor outputs (software setting «NPN/sink», see chap. 9.11.8), on a version with 2 fixed connectors

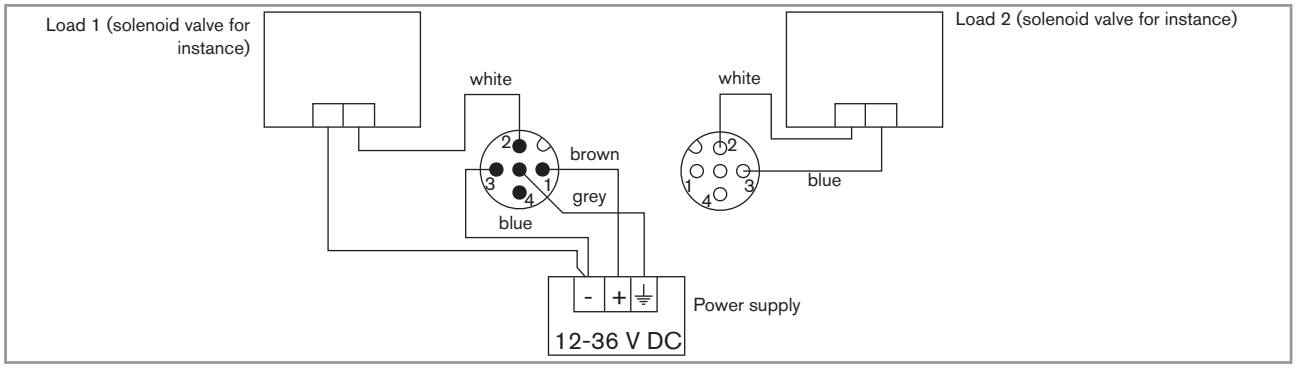


Fig. 23: PNP wiring of both transistor outputs (software setting „PNP/source“, see chap. 9.11.8), on a version with 2 fixed connectors

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

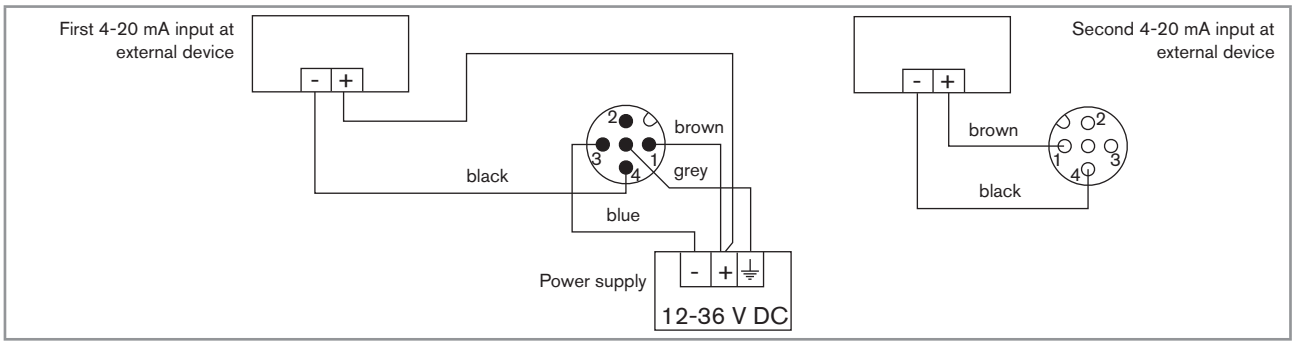


Fig. 24: Wiring of both current outputs in sinking mode (software setting «NPN/sink», see chap. 9.11.8), on a version with 2 fixed connectors

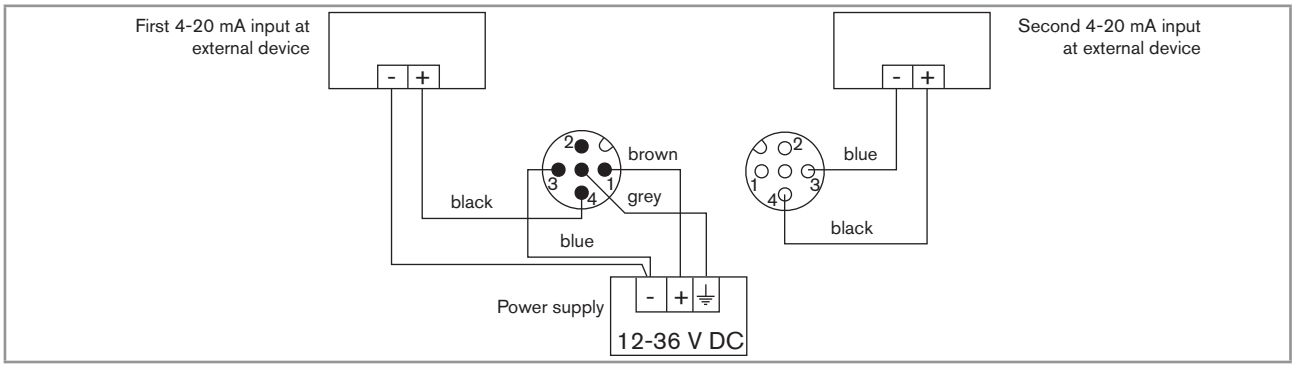


Fig. 25: Wiring of both current outputs in sourcing mode (software setting «PNP/source», see chap. 9.11.8), on a version with 2 fixed connectors

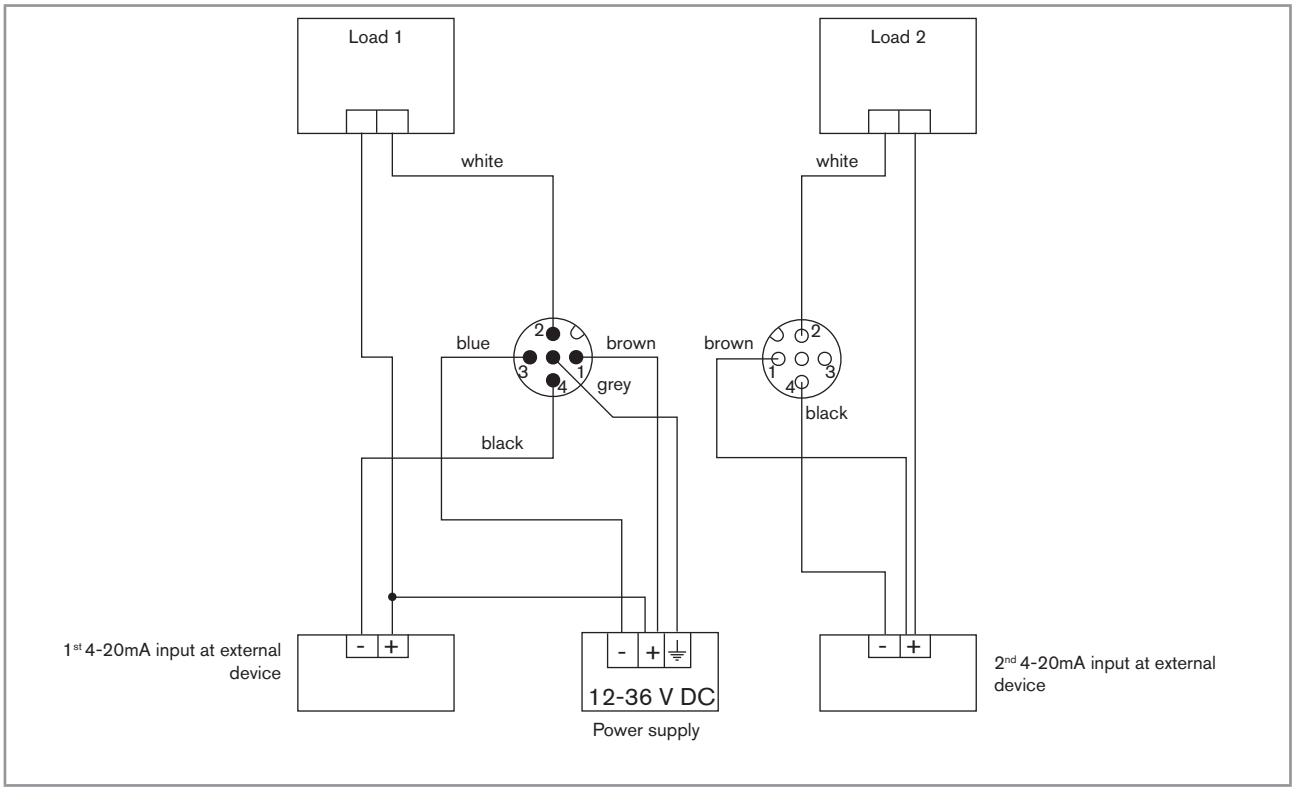


Fig. 26: NPN wiring of both transistor outputs and wiring of both current outputs in sinking mode, on a version with 2 fixed connectors (software setting «NPN/sink», see chap. 9.11.8)

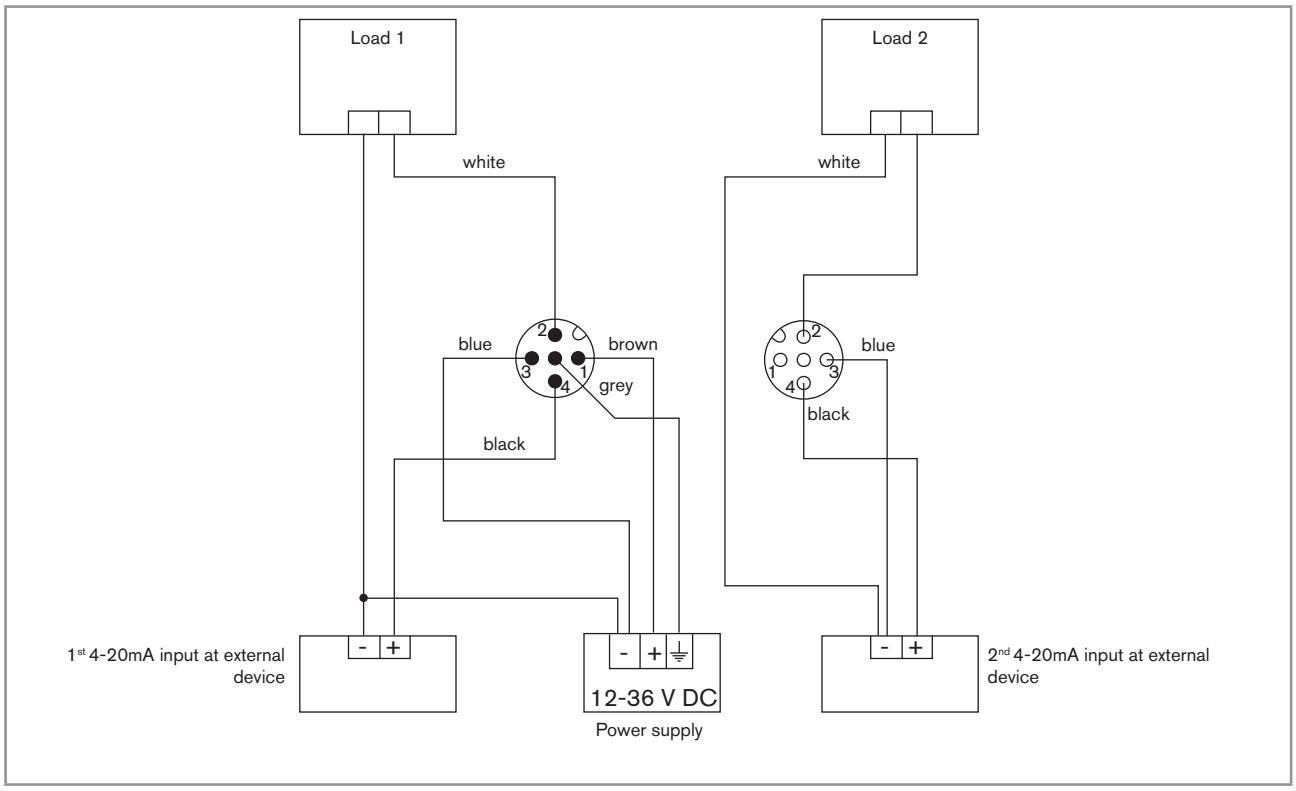


Fig. 27: PNP wiring of both transistor outputs and wiring of both current outputs in sourcing mode, on a version with 2 fixed connectors (software setting «PNP/source», see chap. 9.11.8)

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9. OPERATING AND COMMISSIONING

9.1. Safety instructions

WARNING

Risk of injury due to nonconforming adjustment.

Nonconforming adjustment could lead to injuries and damage the device and its surroundings.

- The operators in charge of adjustment must have read and understood the contents of this manual.
- In particular, observe the safety recommendations and intended use.
- The device/installation must only be adjusted by suitably trained staff.

WARNING

Danger due to nonconforming commissioning.

Nonconforming commissioning could lead to injuries and damage the device and its surroundings.

- Before commissioning, make sure that the staff in charge have read and fully understood the contents of the manual.
- In particular, observe the safety recommendations and intended use.
- The device/installation must only be commissioned by suitably trained staff.

9.2. Operating levels

The device has 2 operating levels:

Read level

This level is used:

- to read the measured values of 2 process values selected in the Parameters menu,
- to read both the lowest and highest values of the chosen process value, that have been measured by the device since the latest reset (this feature is not active by default),
- to reset both the lowest and highest values of the chosen process value, if the feature has been activated,
- to read the current values emitted on the 4-20 mA outputs.

Settings level

This level comprises 5 menus:

Menu title	Related icon
"Param": see chap. 9.11	
"Calib": see chap. 9.12	
"Diagnostic": see chap. 9.13	
"Test": see chap. 9.14	

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Menu title	Related icon
"Info": see chap. 9.15	

9.3. Using the navigation button

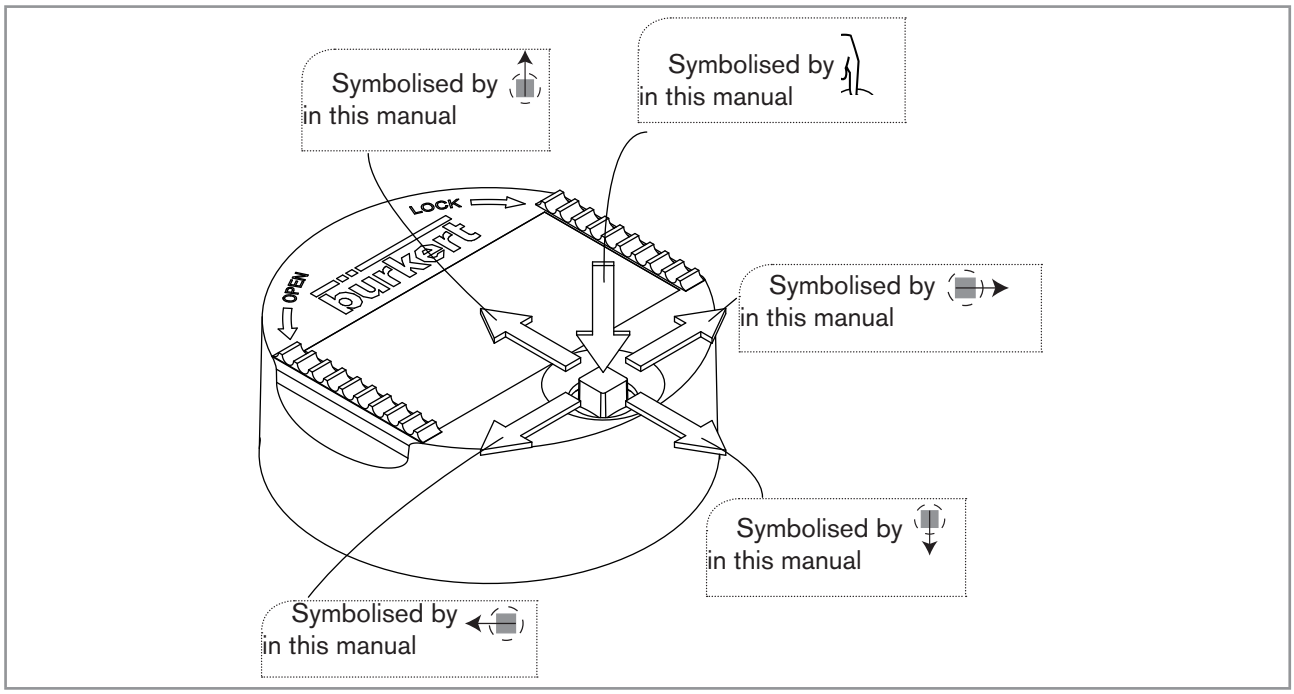


Fig. 28: Using the navigation button

You want to...	Press...
...browse in Read level	▪ next screen: ▪ previous screen:
▪ ...access the Settings level ▪ ...display the Param menu	for at least 2 sec., from any screen of the Read level
...browse in the menus of the Settings level	▪ next menu: ▪ previous menu:
...access the menu displayed	

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

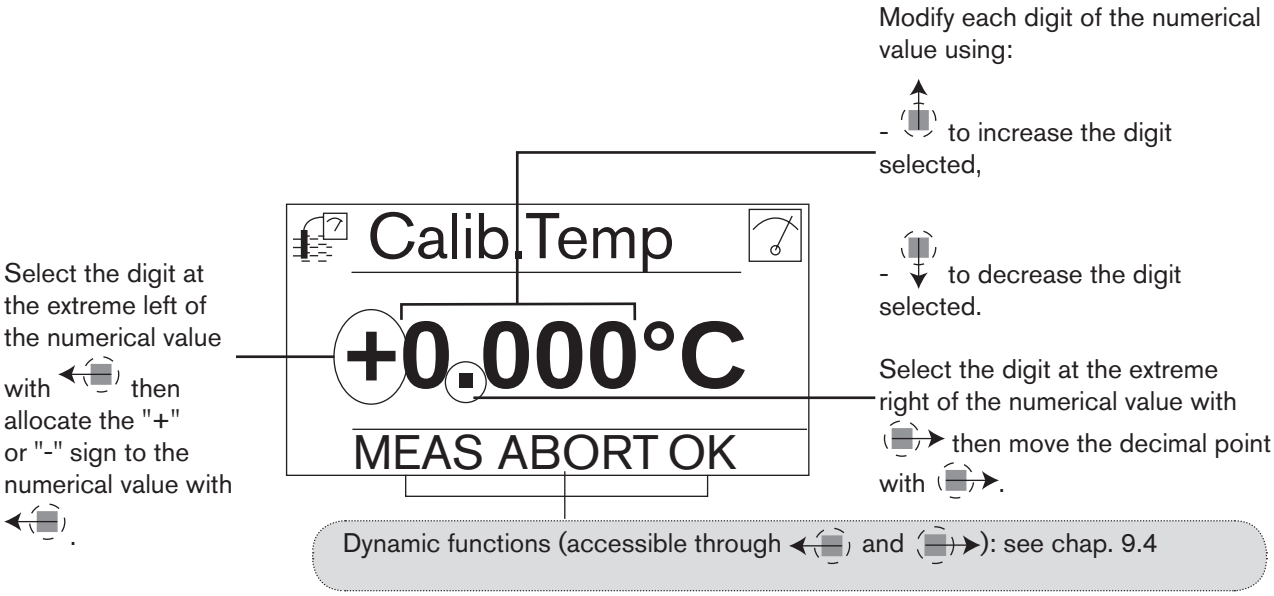
You want to...	Press...
...browse in the menu functions	▪ next function:  ▪ previous function: 
...select the highlighted function	
...browse in the dynamic functions bar (MEAS, BACK, ABORT, OK, YES, NO)	▪ next function:  ▪ previous function: 
...confirm the highlighted dynamic function	
...modify a numerical value	
- increment the figure selected	- 
- decrement the figure selected	- 
- select the previous figure	- 
- select the next figure	- 
- allocate the "+" or "-" sign to the numerical value	-  to the extreme left of the numerical value then  until the desired sign is displayed
- move the decimal point	-  to the extreme right of the numerical value then  until the decimal point is in the desired place

9.4. Using the dynamic functions

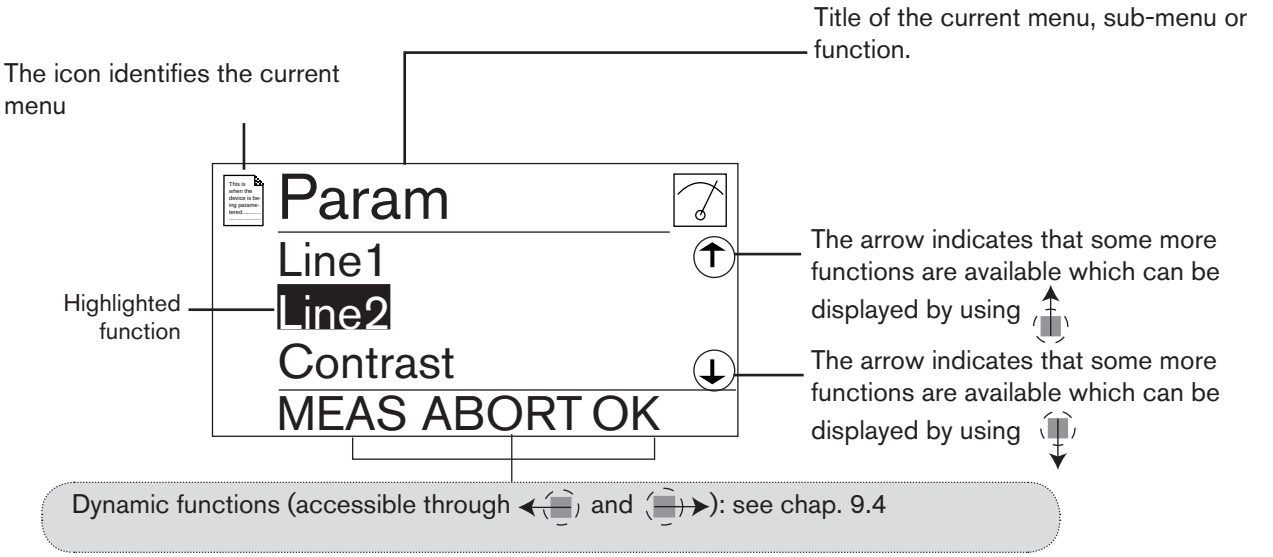
You want to...	Choose...
...go back to the READ level, without validating the modifications made	dynamic function "MEAS"
...validate the input	dynamic function "OK"
...go back to the parent menu	dynamic function "BACK"
... abort the current operation and go back to the parent menu	dynamic function "ABORT"
...answer the question asked	dynamic function "YES" or "NO"

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.5. Example for the input of a numerical value



9.6. Example for browsing in a menu



MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.7. Description of the display

9.7.1. Description of icons and LEDs

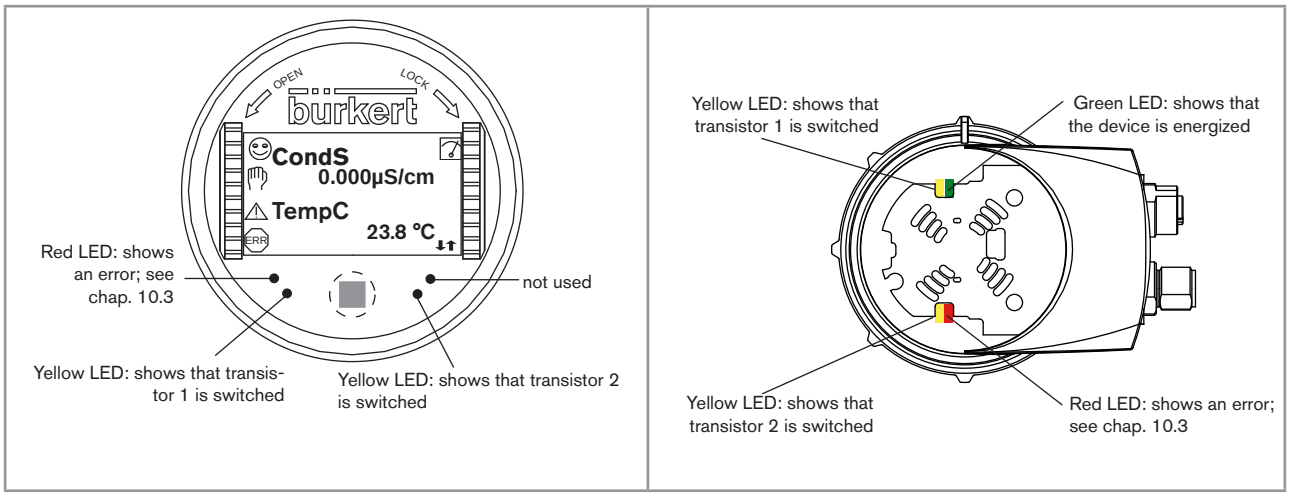


Fig. 29: Position of the icons and description of the LEDs

The LEDs of the display module are duplicated on the electronic board that is located under the display module: these LEDs become visible when the transmitter is not equipped with the display module.

Icon	Meaning and alternatives
	Sensor in good condition, fluid conductivity and fluid temperature within the set ranges. If the monitoring of the conductivity and/or the fluid temperature and/or the fluid conductivity has been activated, the alternative icons in this position are: ▪ , associated with : see chap. 9.13.2, 9.13.3, 9.13.4, 9.15.1 and 10.3 ▪ , associated with : see chap. 9.13.2, 9.13.3, 9.13.4, 9.15.1 and 10.3
	The device is measuring. The alternative icons in this position are: ▪ HOLD flashing: HOLD mode activated (see chap. 9.12.1) ▪ T: running check that the outputs are working and behaving correctly (see chap. 9.14.2 and 9.14.3)
	"maintenance" message; see chap. 9.14.2, 9.15.1 and 10.3
	"warning" message; see chap. 9.11.10, 9.13.2, 9.13.3, 9.13.4 , 9.15.1 and 10.3
	"error" message; see chap. 9.13.2, 9.13.3, 9.13.4, 9.15.1 and 10.3

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.7.2. When switching on the device

When the device is switched on or the display module mounted on the electronic module, the display indicates the software version of the display.

The display then shows the first screen in READ level:

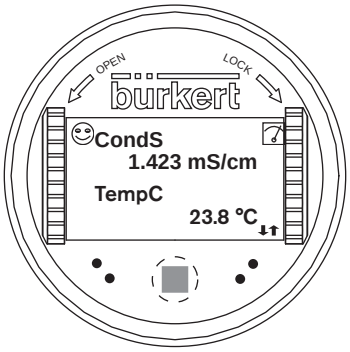
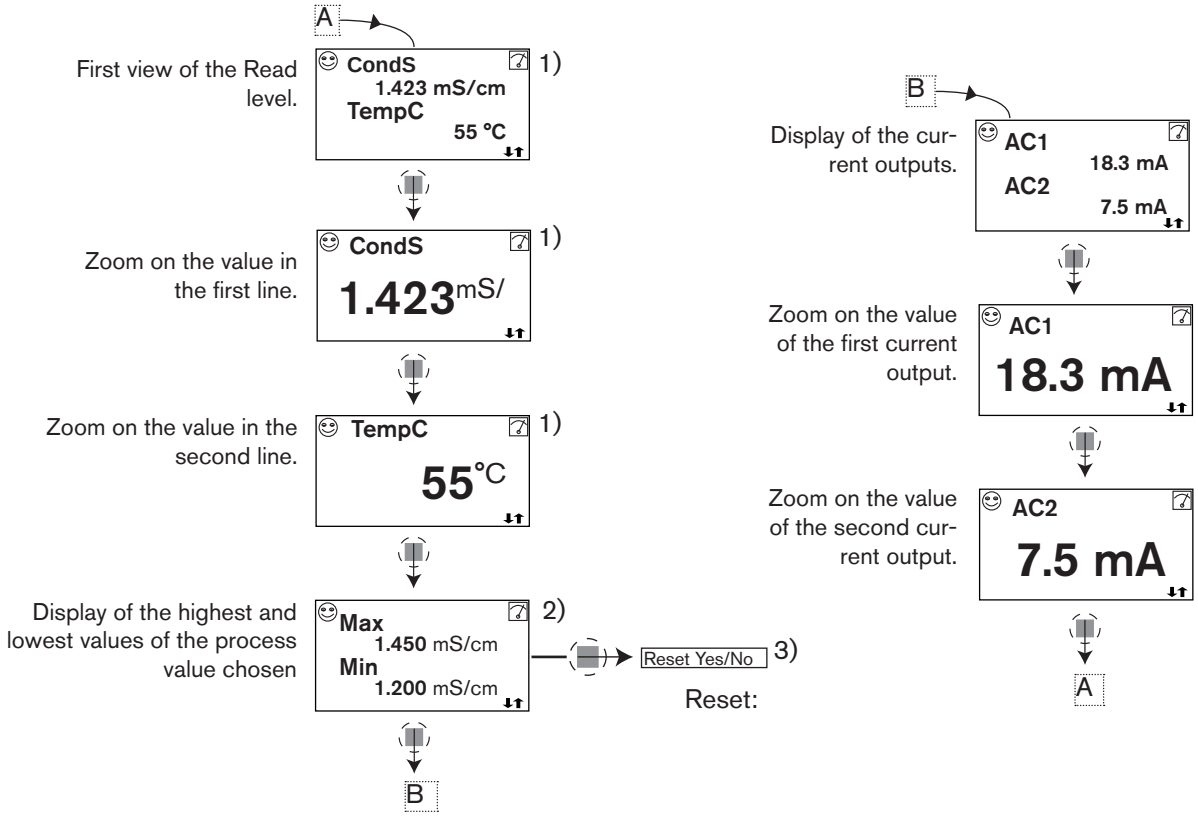


Fig. 30: Display indications when powering on the device

9.8. Read level

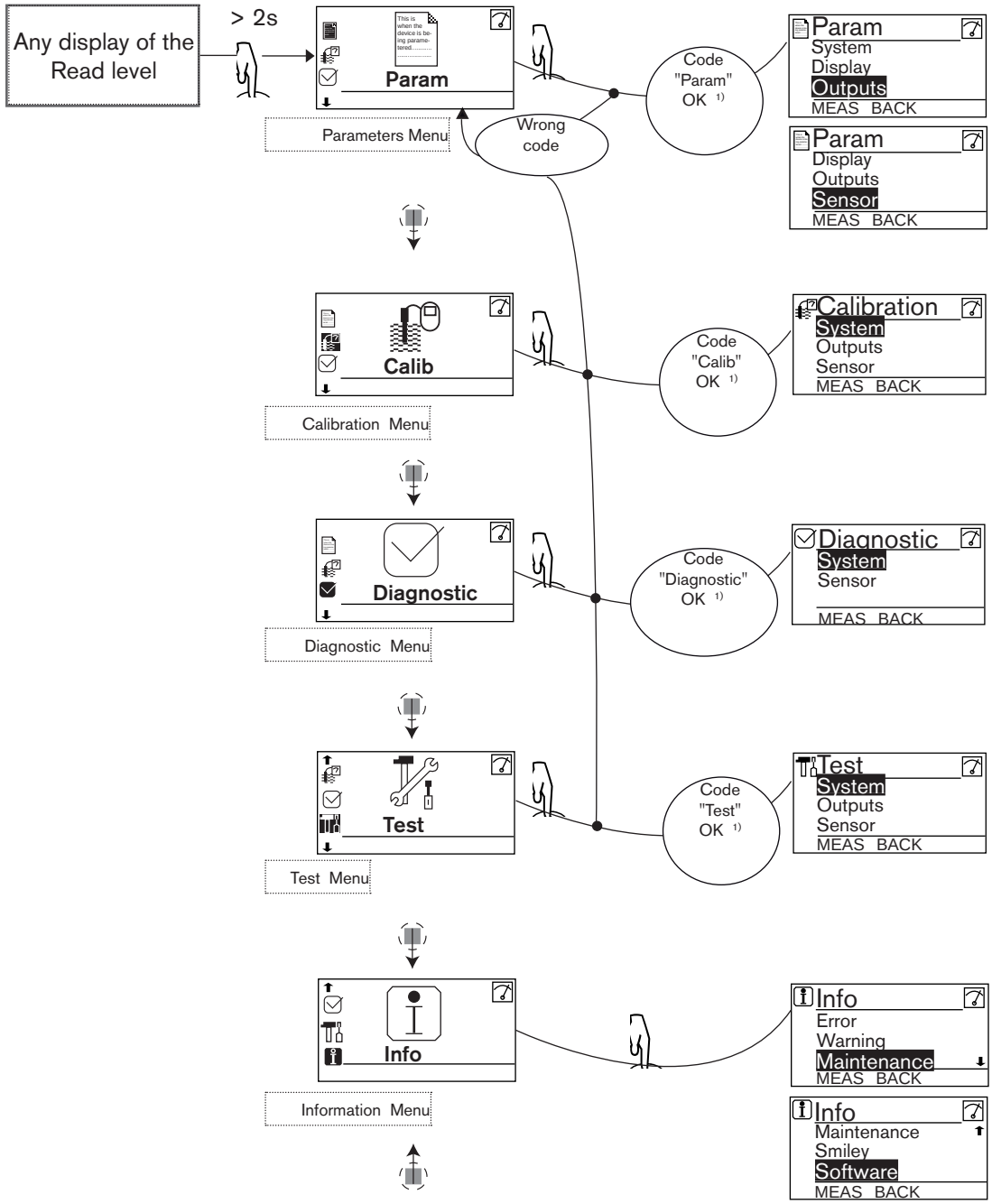


[1)] To choose the process values to be displayed see chap.9.11.5

[2)] The display of the lowest and highest values in the Read level is deactivated by default. To activate the feature and choose the process values see chap. 9.11.6

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.9. Accessing the Settings level



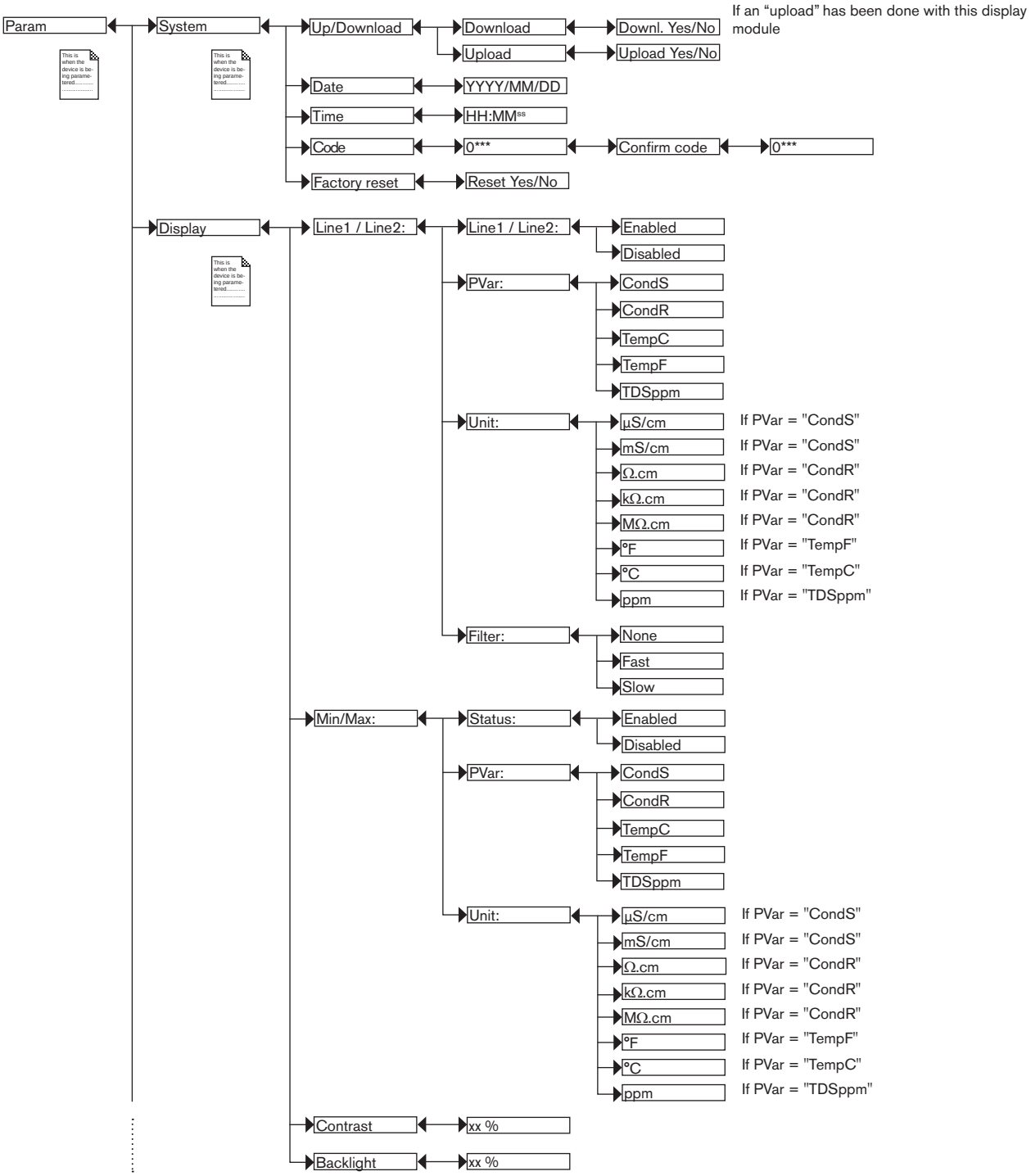
1) Default code "0000"

→ See chap. 9.10 for the detailed menu functions

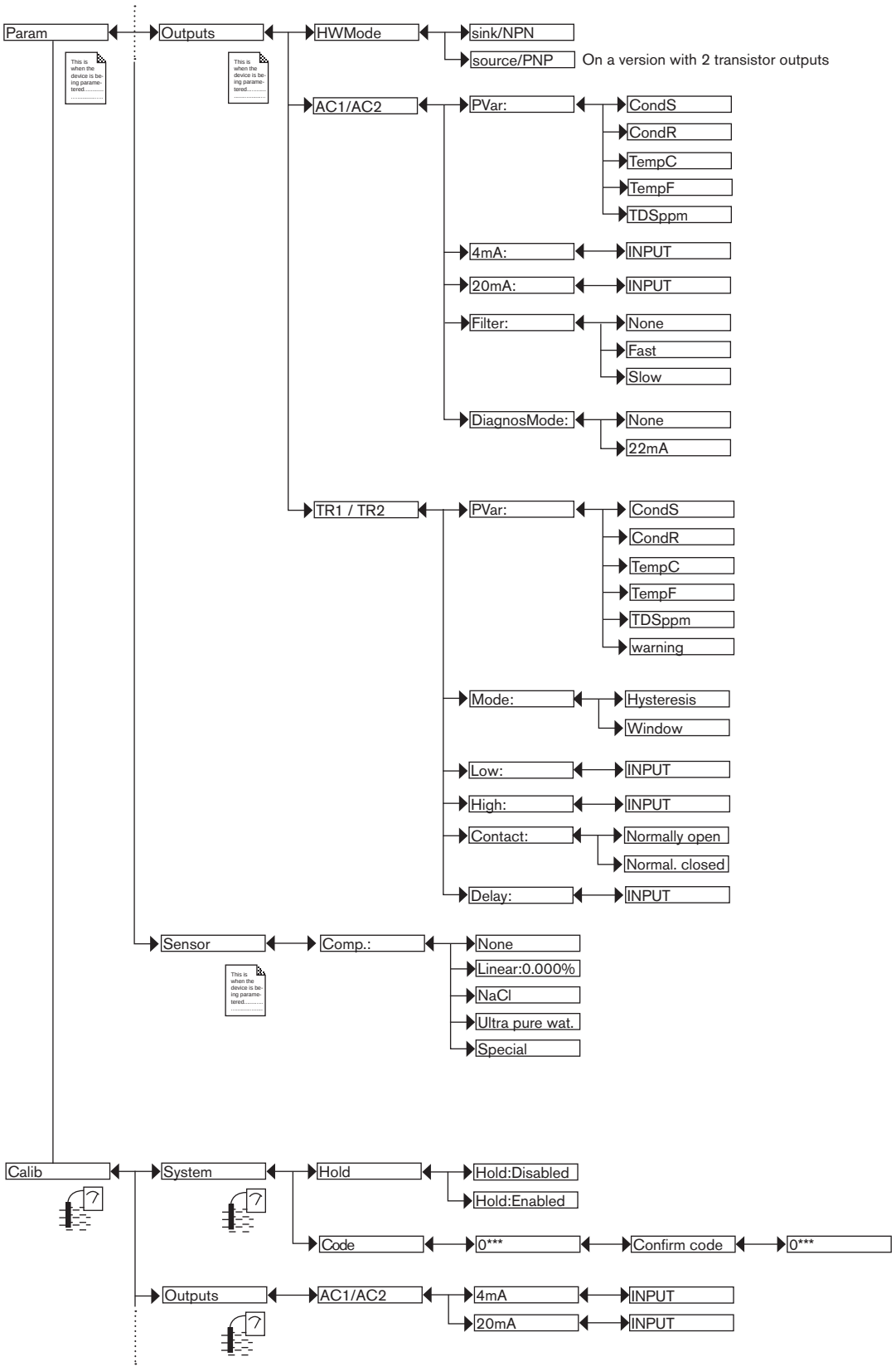
MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.10. Menu structure of the Settings level

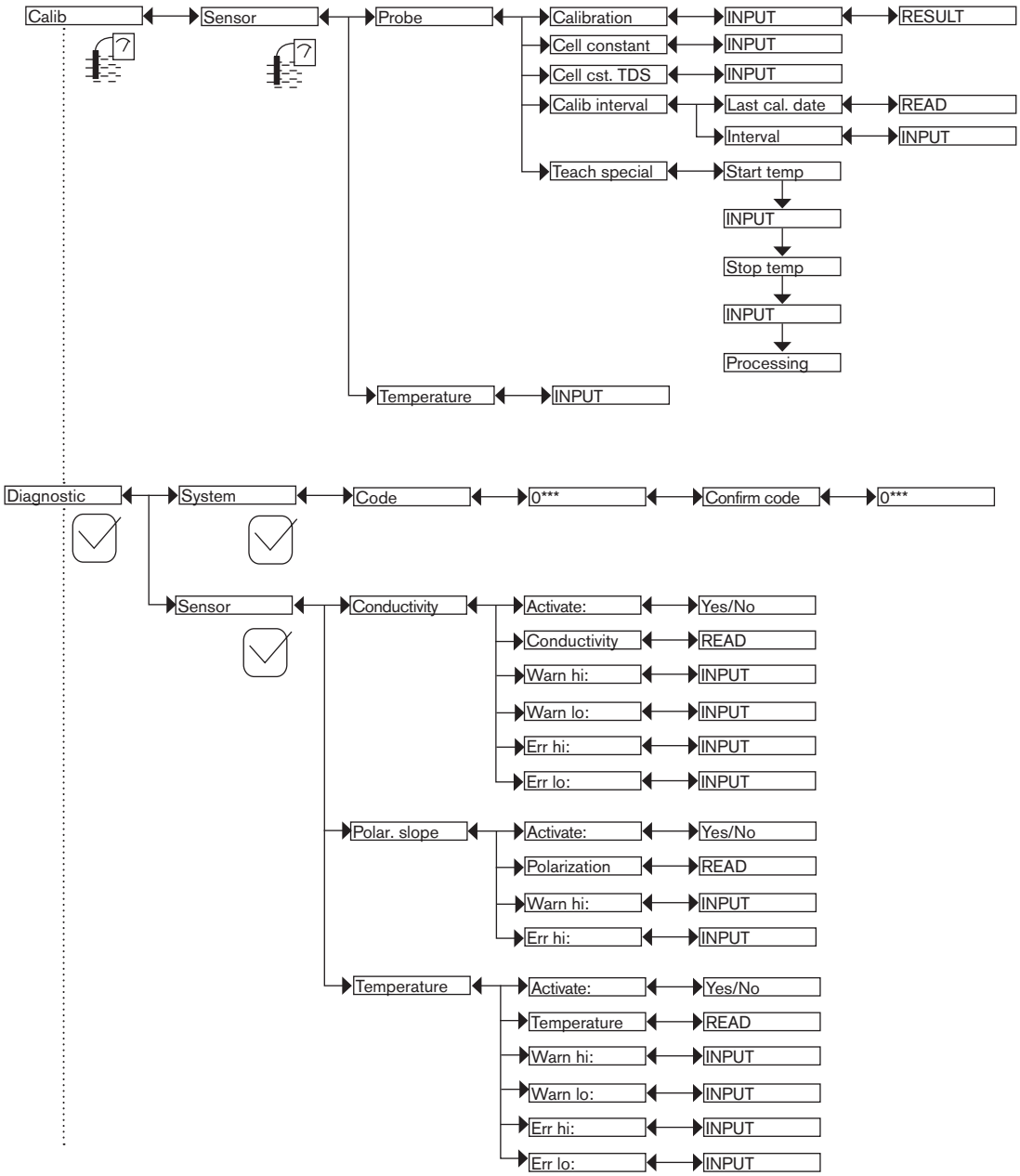
See chap. 9.8 to access the Settings level.



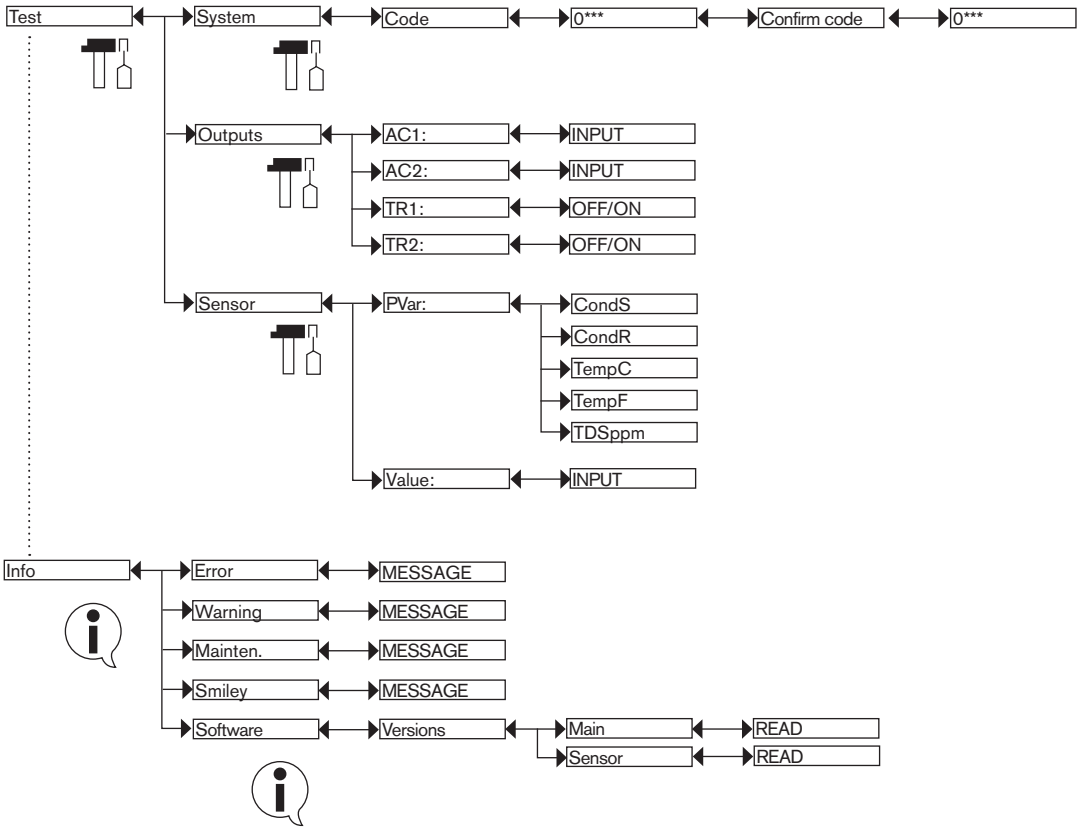
MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015



MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015



MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015



9.11. Parameters Menu

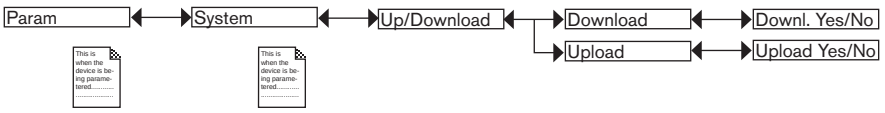
9.11.1. Transferring data from one device to another

See chap. 9.9 to access the Parameters menu.

The function is only possible with a display module with software version V2 and a transmitter with a V2 software version of the acquisition / conversion module for the measured process values.

- On the transmitter, check the sofware version of the acquisition / conversion module for the measured process values in the menu Info -> Software -> Versions -> Main.
- The software version of the display module is displayed when the display module is energized.

- The “DOWNLOAD” function is only available if an UPLOAD has been successfully performed.
- Never interrupt an upload or download procedure else the transmitter may be damaged.



MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

The following data can be transferred from one device to another device of the same type:

- user settings in the menu PARAM (except the date, the time, the contrast level and the brightness of the display),
- user settings in the menu DIAGNOSTIC,
- TDS factor set by the user in the menu Calib -> Sensor -> Probe -> Cell cst TDS,
- the access codes to the menus.

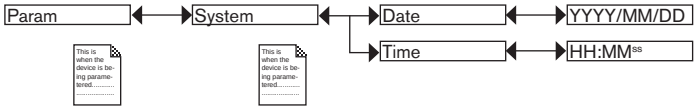
DOWNLOAD: transfer the data previously uploaded into the display module using the UPLOAD function.

The parameters transferred are used by the device as soon as the message “Download OK” is displayed.

UPLOAD: upload data from the transmitter to the display module.

9.11.2. Setting the date and time

See chap. 9.9 to access the Parameters menu.

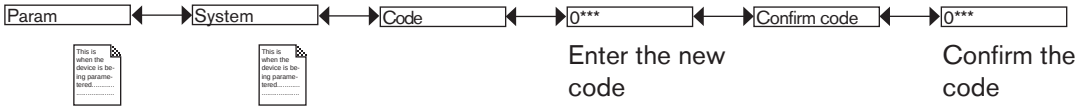


DATE: set the date (input format: year/month/day in the form YYYY/MM/DD)

TIME: set the time (input format: hours:minutes^{secondes})

9.11.3. Modifying the PARAM menu access code

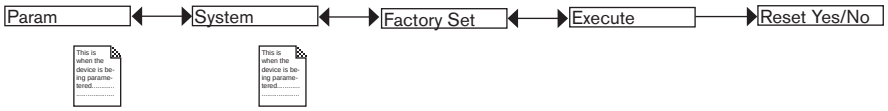
See chap. 9.9 to access the Parameters menu.



Default access code to the Parameters menu: 0000.

9.11.4. Restoring the default parameters of the Read level and the outputs

See chap. 9.9 to access the Parameters menu.



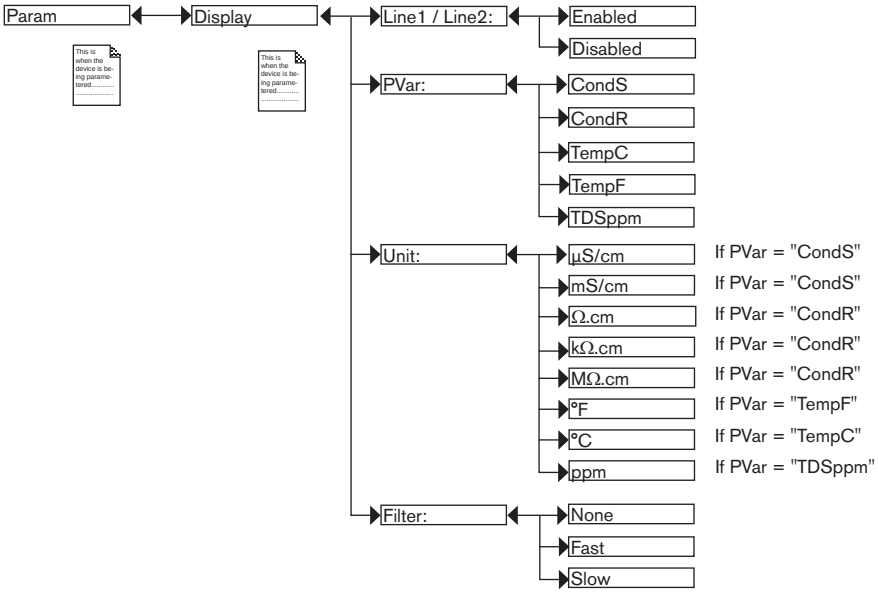
→ Choose “Yes” to restore the default parameters.

→ Choose “No” to keep the current parameters.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.11.5. Setting the data displayed in the READ level

See chap. 9.9 to access the Parameters menu.



PVAR: choose the process value to be displayed on the line selected.

UNIT: choose the unit for the process value displayed.

FILTER: choose the filter level for the measurement values displayed on the line selected. Three filter levels are proposed: “slow”, “fast” or “none”.

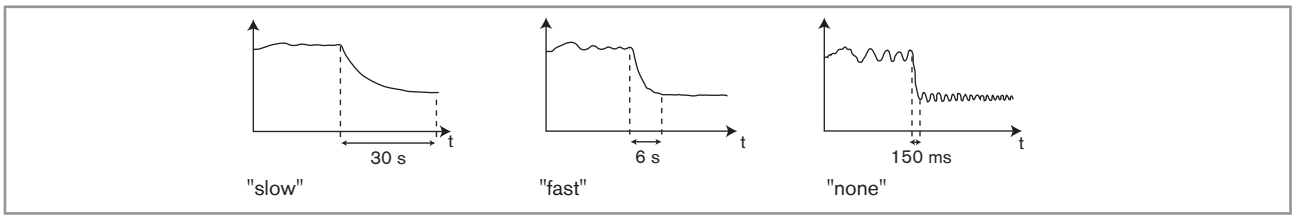
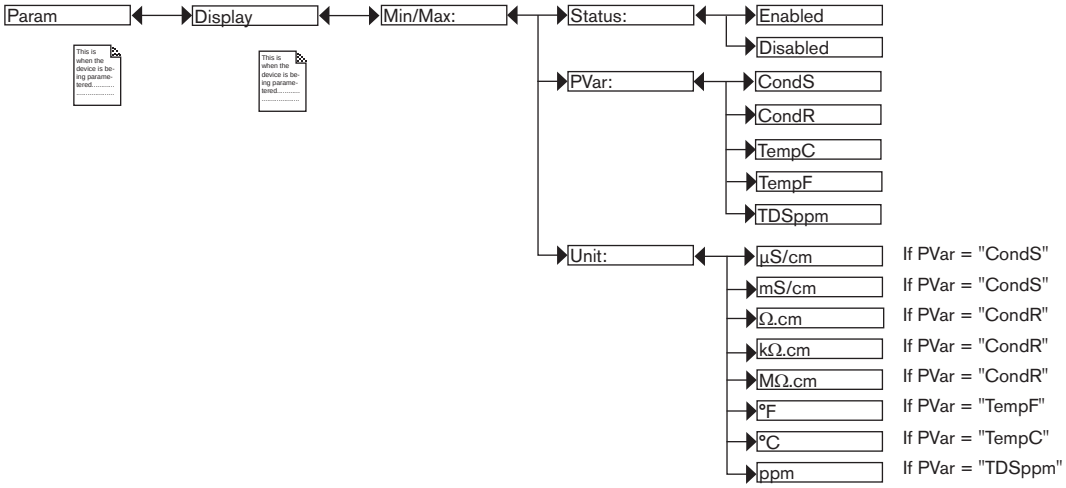


Fig. 31: Filter curves

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.11.6. Displaying of the lowest and highest values measured

See chap. 9.9 to access the Parameters menu.



STATUS: choose to display (choice “Enabled”) or not display (choice “Disabled”) the highest and lowest measured values (of the process value chosen in PVAR hereafter) since the latest reset.

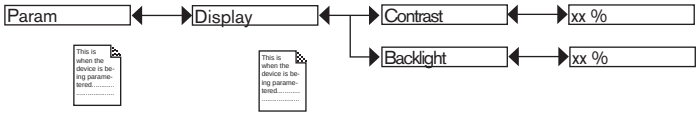
PVAR: choose the process value which highest and lowest measured values are displayed in the Read level.

UNIT: choose the preferred unit in which the lowest and highest measured values are displayed.

9.11.7. Setting the display contrast and brightness

See chap. 9.9 to access the Parameters menu.

On a version with one M12 fixed connector, do not increase the default setting of the display brightness (parameter "Backlight").



→ Set each percentage using and .

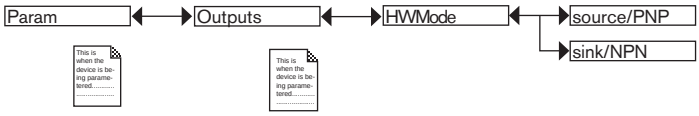
CONTRAST: choose the display contrast level (as a %).

BACKLIGHT: choose the light intensity of the display (as a %) on a version with 2 fixed connectors only.

These settings only affect the display module. They are not factored in during a device data UPLOAD (see chap. 9.11.1).

9.11.8. Choosing the output wiring mode

See chap. 9.9 to access the Parameters menu.



MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

The setting has no effect on a version with one fixed connector, if the sole current output is wired. See Fig. 18.

The wiring mode is the same for all outputs.

If you choose “sink NPN”, the current outputs must be wired in sinkink mode and the transistor outputs in NPN mode.

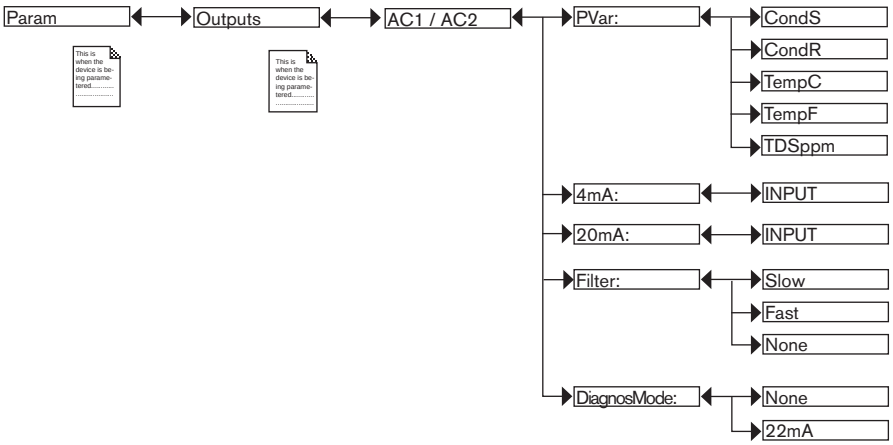
If you choose “source PNP”, the current outputs must be wired in sourcing mode and the transistor outputs in PNP mode.

See the wiring for the outputs in chap. 8.3.

9.11.9. Setting the parameters of the current outputs

See chap. 9.9 to access the Parameters menu.

The 2nd current output “AC2” is only available on a version with 2 fixed connectors.



PVAR: choose a process value (impedance in Ω.cm, conductivity in S/cm, temperature in °C, temperature in °F or total dissolved solids in ppm) associated with current output 1 resp. current output 2.

4mA: choose the value of the process value (previously selected), associated with a current of 4 mA, for each current output.

20mA: choose the value of the process value (previously selected), associated with a current of 20 mA, for each current output.

Functions “4mA” and “20mA” are used to define the measurement range for the process value associated with the current on the 4-20 mA output.

P_1 and P_2 are the values associated with a current of 4 mA or 20 mA respectively:

If P_1 is higher than P_2, the signal is inverted and the range P_1-P_2 corresponds to the range for the 20-4 mA current.

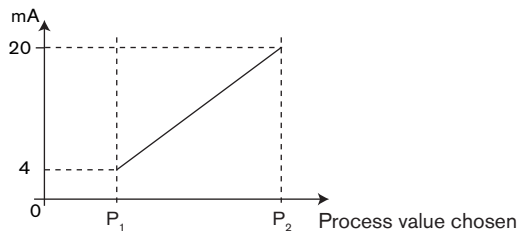


Fig. 32: 4-20 mA current depending on the process value selected

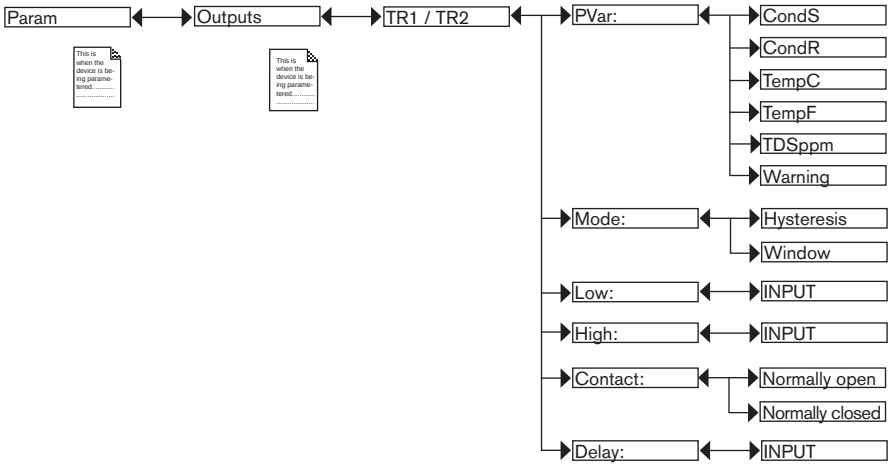
FILTER: choose the level of damping for the fluctuations of the current value for each current output. Three damping levels are proposed: slow, fast or none. The damping for the current outputs is similar to the damping of the display. See Fig. 31.

DIAGNOSMODE: choose to emit a current of 22 mA on the current output selected when an “error” event related to diagnostics (see chap. 9.13.2, 9.13.3 and 9.13.4)) is generated by the transmitter or allow the current output to operate normally (choose “none”).

See also "If you encounter problems" in chap. 10.3.

9.11.10. Setting the parameters of the transistor outputs

See chap. 9.9 to access the Parameters menu.



PVAR: choose a process value (impedance in .cm, conductivity in S/cm, temperature in °C, temperature in °F or total dissolved solids in ppm) associated with transistor output 1 resp. transistor output 2 or associate the “warning” message (see chap. 9.12.4, 9.13.2, 9.13.3, 9.13.4 and 9.15.1) with transistor output 1 resp. transistor output 2.If the selected transistor output is linked to the “warning” event, the transistor switches as soon as such an event is generated by the transmitter. See also “If you encounter problems” at chap. 10.3.

MODE: choose the operating, hysteresis or window, for transistor output 1 or transistor output 2. See Fig. 33 and Fig. 34.

LOW: enter the low switching threshold value for transistor output 1 or transistor output 2. See Fig. 33 and Fig. 34.

HIGH: enter the high switching threshold value for transistor output 1 or transistor output 2. See Fig. 33 and Fig. 34.

CONTACT: choose the type of off-position (normally open, NO, or normally closed, NC) of transistor output 1 or transistor output 2. See Fig. 33 and Fig. 34.

DELAY: choose the value of the time delay prior to switching for each transistor output.

Switching only occurs if one of the thresholds, high or low (functions “High” or “Low”), is exceeded for a duration longer than this time delay. See Fig. 33 and Fig. 34. The time delay before switching is applicable to both output thresholds.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Hysteresis operating

The change of status is done when a threshold is detected (increasing measured value: threshold high (function High) to be detected; decreasing measured value: threshold low (function Low) to be detected).

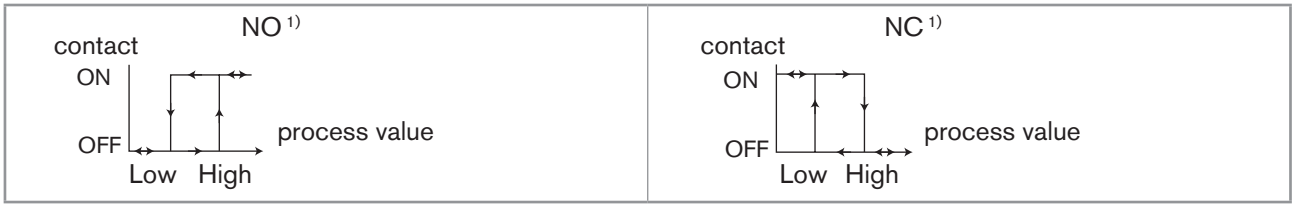


Fig. 33: Hysteresis operating

Window operating

The change of status occurs whenever one of the thresholds is detected.

Fig. 34: Window operating

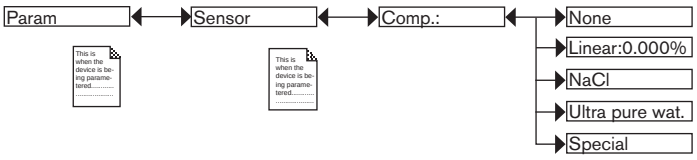
1) NO = Normally open; NC = Normally closed

9.11.11. Choosing the type of temperature compensation

See chap. 9.9 to access the Parameters menu.

This menu is used to deactivate the temperature compensation (choice “none”) or choose the type of temperature compensation to determine the conductivity of the fluid:

- according to a linear percentage (choice “linear”). See below.
- or according to a predefined graph (NaCl or ultra pure water). The compensation graph “NaCl” is valid for the 10 to 80 °C temperature range and a concentration of 0,2 %.
- or according to a graph defined especially for your process (choice “Special”) using the “Teach special” function in the “Calibration - Sensor” menu, “Probe” function. See chap. 9.12.4

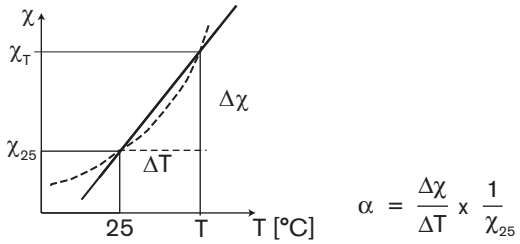


Linear temperature compensation (choice “Linear”)

The linear temperature compensation may be sufficiently precise for your process whenever the temperature of your process is always > 0°C. Enter a compensation value between 0.00 and 9.99 %/°C.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Use the following graph and equation to calculate the average value of the compensation coefficient α according to a temperature range ΔT and the associated conductivity range $\Delta\chi$:

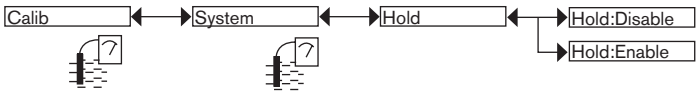


$$\alpha = \frac{\Delta\chi}{\Delta T} \times \frac{1}{\chi_{25}}$$

9.12. Calibration menu

9.12.1. Activating/deactivating the Hold function

See chap. 9.9 to access the Calibration menu.



The Hold mode is automatically deactivated when the transmitter restarts after a power interruption, if the Hold mode was activated at the moment of the power cut off.

The Hold mode is used to carry out maintenance work without interrupting the process.

To activate the HOLD mode:

→ enter the “HOLD” function;

→ choose “enabled”;

→ validate by “OK”.

In practice, when the device is in Hold mode:

- the HOLD icon is displayed in place of the icon;
- the current emitted on each 4-20 mA output is fixed at the value of the last measurement of the process value associated with each output;
- each transistor output is fixed at the status acquired at the moment the Hold function is activated;
- the device is in Hold mode until the HOLD function is deactivated.

To deactivate the HOLD mode:

→ enter the “HOLD” function;

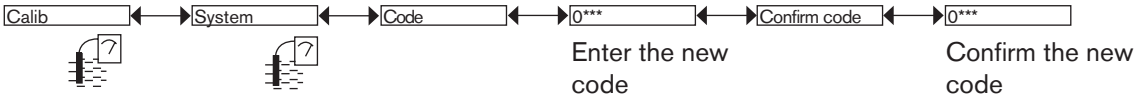
→ choose “disabled”;

→ validate by “OK”.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.12.2. Modifying the Calibration menu access code

See chap. 9.9 to access the Calibration menu.



Default access code to the Calibration menu: 0000.

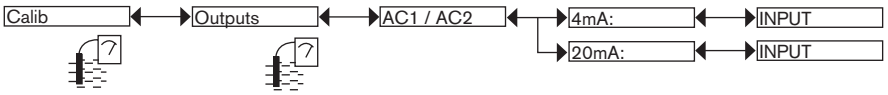
9.12.3. Adjust the current outputs

WARNING

Risk of injury due to wrong adjustment.

- Make sure the Hold mode is disabled (see chap. 9.12.1).

See chap. 9.9 to access the Calibration menu.



4mA: adjust the current output 1 or current output 2 for 4 mA.

When the “4mA” function is selected, the transmitter generates a current of 4 mA: measure the current emitted by the 4-20 mA output using a multimeter and enter the value given by the multimeter in the function “AC1.4mA” or “AC2.4mA”.

20mA: adjust the current output 1 or current output 2. for 20 mA

When the “20mA” function is selected, the transmitter generates a current of 20 mA: measure the current emitted by the 4-20 mA output using a multimeter and enter the value given by the multimeter in the function “AC1.20mA” or “AC2.20mA”.

9.12.4. Calibrating the sensor

DANGER

Risk of injury due to electrical voltage.

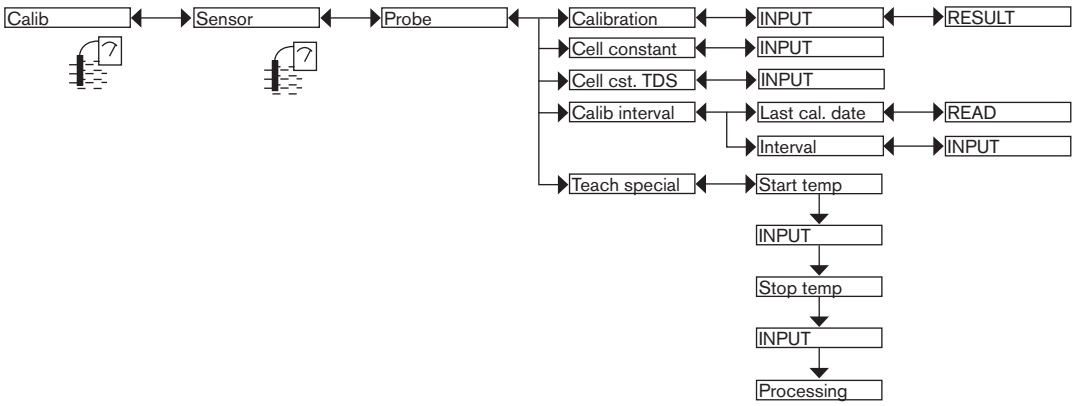
- Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to the nature of the fluid.

- Respect the regulations on accident prevention and safety relating to the use of aggressive fluids.

See chap. 9.9 to access the Calibration menu.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015



→ Calibrate the sensor using one of the following methods:

- *CALIBRATION*: calibrate the conductivity sensor by determining its specific C constant. See details on next page. This calibration updates the last calibration date (“Last cal. date” function of the CALIB INTERVAL sub-menu hereafter).
- *CELL CONSTANT*: enter the cell constant marked on the sensor nameplate or read the last cell constant determined by using the function Calibration above. This input does not update the last calibration date (“Last cal. date” function of the CALIB INTERVAL sub-menu hereafter).

CELL CST TDS: enter the TDS factor suited to your process. The TDS factor allows for calculating the amount of Total Dissolved Solids (TDS), in ppm, depending on the measured conductivity. The default TDS factor is 0,46 (NaCl)

CALIB INTERVAL: read the date of the last calibration (function “Last cal. date”) and set the periodicity of calibrations, in days (function “Interval”): the transmitter generates a “maintenance” event by displaying the icon and a “warning” message, each time a calibration is due. Set function “Interval” to “0000 days” to ignore the function.

- The "warning" message may be associated with one or other or both transistor outputs (see chap. 9.11.10).
- See also "If you encounter problems" at chap. 10.3.

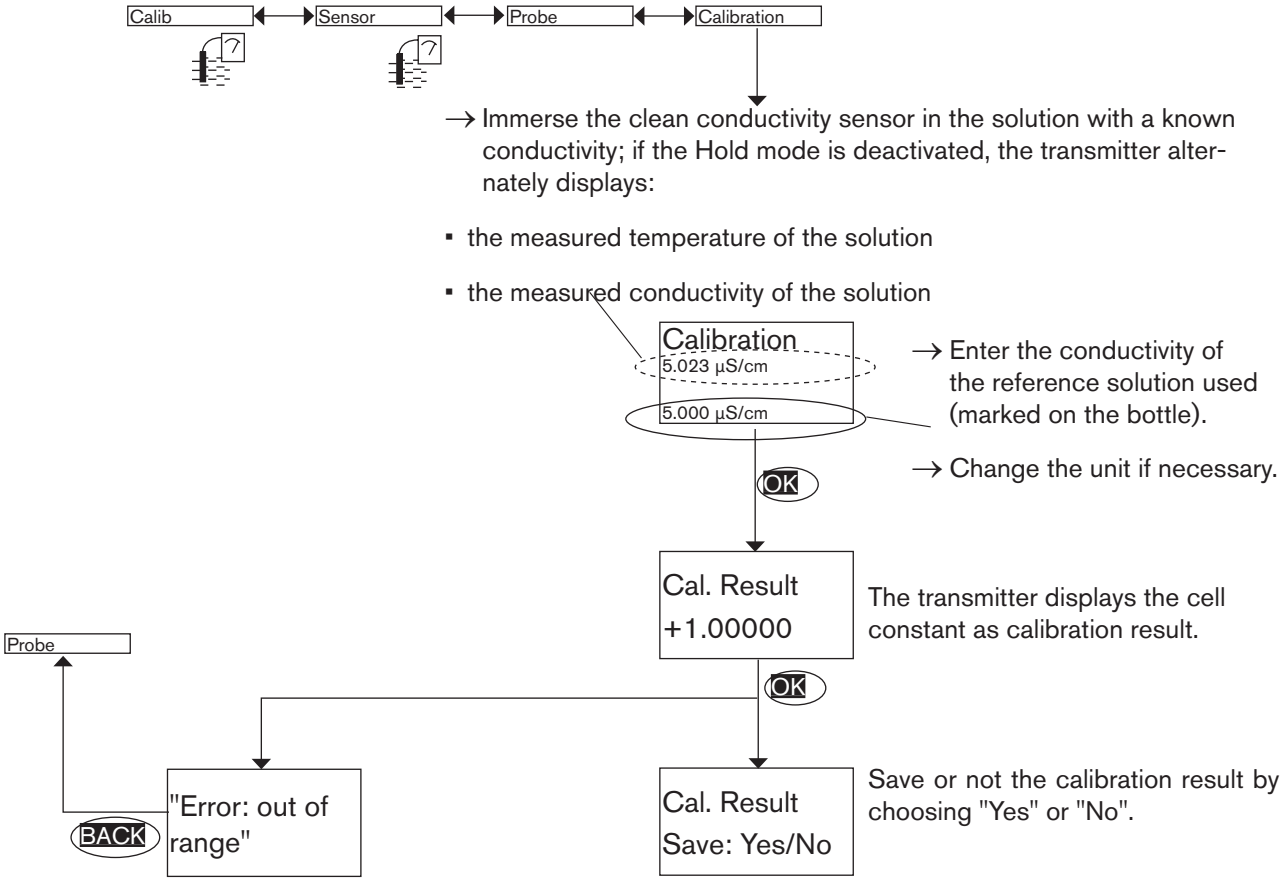
TEACH SPECIAL: define the temperature compensation graph specific to your process. The graph thus determined and memorised is used by the transmitter when you choose “Special” in the “Comp.” function in the menu “Param - Sensor” (see chap. 9.11.11). See details on next page.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Calibrate the conductivity sensor (“Calibration” function in the “Probe” menu)

Calibration consists in determining the C constant specific to each conductivity sensor using a solution with a known conductivity.

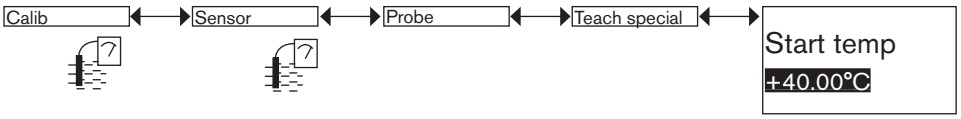
- In order not to interrupt the process, activate the HOLD function (see chap. 9.12.1).
- Before each calibration, correctly clean the electrodes with a suitable product.
- Set the periodicity of calibrations in the "Interval" function in the sub-menu "Calib interval" (see previous page): each time a calibration is due, the transmitter generates a "maintenance" event and a "warning" message.



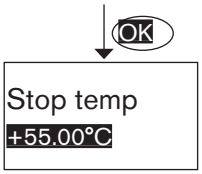
The message "Error: out of range" signals that the cell constant is out of the authorized range (< 0.008 or > 12); this may be due to either:

- a mistake made when entering the conductivity, or
- the conductivity sensor, which is not able to measure the solution conductivity.

Define the temperature compensation graph specific to your process (“Teach special” function in the”Probe” menu)



→ Enter the value for the start of the temperature range for which the compensation graph must be determined.

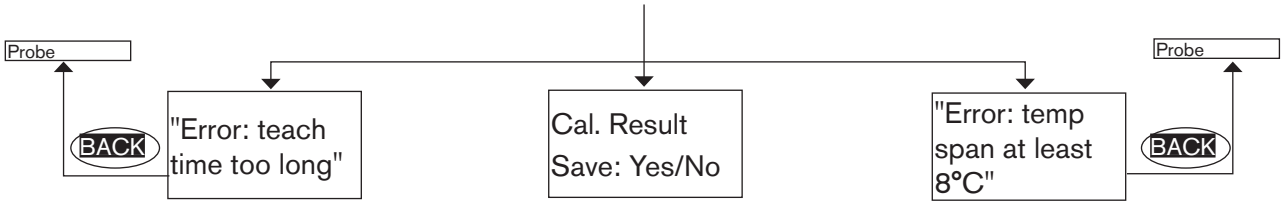


The fluid temperature range (T-; T+) must be entered in such a way that the difference between T- and T+ is greater than 8 °C. The message "Error: Temp span at least 8 °C" is displayed if the difference between the range start and end values is less than 8 °C.

→ Enter the value of the end of the temperature range for which the compensation graph must be determined.

The transmitter determines the compensation graph with 10 points and, if the Hold mode is deactivated (chap. 9.12.1), alternately displays the measured solution conductivity and the measured solution temperature.

- During measurement, the fluid temperature must pass 25 °C.
- Immerse the sensor in the solution and progressively reheat:
  - from T- to T+ if T- < 25 °C < T+
  - from 25 °C to T+ if 25 °C < T- < T+
  - from T- to 25 °C if T- < T+ < 25 °C
- The rise in temperature must be slow because of the inertia of the temperature sensor.
- Avoid the formation of bubbles on the conductivity sensor.



The message "Error: TeachTime too long" may be displayed during the graph definition. It signals either:

- that the fluid has been heated too slowly (25 minutes elapsed between 2 measuring points).
- or that the fluid temperature has not passed 25 °C.

At the end of processing, you are requested to save the calculated graph or not.

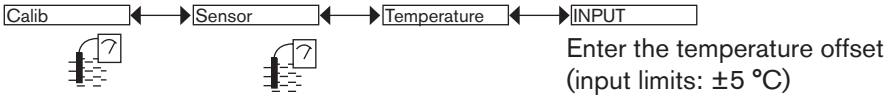
The message "Error: Temp span at least 8 °C" is displayed if the difference between the range start and end values is less than 8 °C.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

9.12.5. Entering an offset for the temperature measurement

See chap. 9.9 to access the Calibration menu.

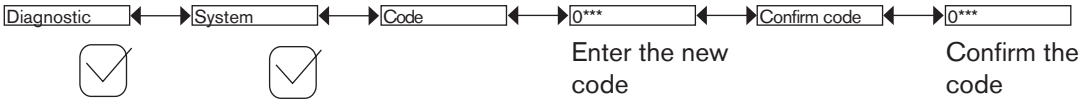
The temperature transmitted by the Pt1000 probe may be corrected. This correction value is the temperature offset.



9.13. Diagnostic menu

9.13.1. Modifying the Diagnostic menu access code

See chap. 9.9 to access the Diagnostic menu.



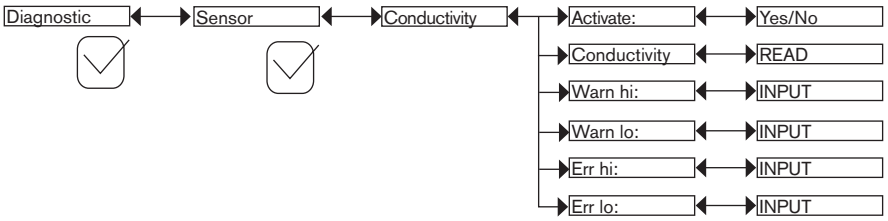
Default access code to the Diagnostic menu: 0000.

9.13.2. Monitoring the fluid conductivity

See chap. 9.9 to access the Diagnostic menu.

A malfunction in your process or the conductivity sensor may be indicated either by too low or too high a fluid conductivity or by an incorrect conductivity measurement.

The function allows for monitoring the fluid conductivity and configure the behaviour of the device if the parametered ranges are exceeded.



To be warned when the fluid conductivity is too low or too high:

→ activate monitoring of the fluid conductivity in the function “activate”, then

→ set a conductivity range outside of which the transmitter generates a “warning” event and displays the ☹ and ⚠ icons.

→ set a conductivity range outside of which the transmitter generates an “error” event and displays the ☹ and ERR icons.

When the transmitter generates a “warning” or “error” event:

→ go into the “Info” menu to read the cause of the event generation.

→ and/or go into the “Sensor” function of the Diagnostic menu to read the measured conductivity value.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

→ if necessary, clean and/or recalibrate the conductivity sensor,

→ if necessary, check the process.

- The "warning" event may also be associated with one or other or both transistor outputs. See chap. 9.11.10, function "Output.TR1" or "Output.TR2".
- The "error" event may also be associated with one or other or both current outputs. See chap. 9.11.9, function "Output.AC1" or "Output.AC2".
- See also "If you encounter problems" at chap. 10.3.

ACTIVATE: choose whether or not to activate monitoring of the fluid conductivity.

CONDUCTIVITY: read the fluid conductivity measured in real time.

WARN HI: enter the fluid conductivity value above which a “warning” event is generated.

WARN LO: enter the fluid conductivity value below which a “warning” event is generated.

ERR HI: enter the fluid conductivity value above which an “error” event is generated.

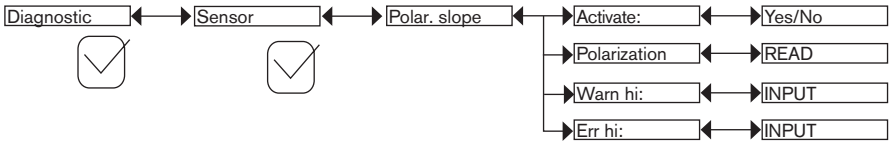
ERR LO: enter the fluid conductivity value below which an “error” event is generated.

9.13.3. Monitoring the polarisation slope

See chap. 9.9 to access the Diagnostic menu.

A malfunction in your process or the conductivity sensor may be shown by too high a polarisation slope.

The function allows for monitoring the polarisation slope and configure the behaviour of the device if the max. thresholds are exceeded.



To be warned when the polarisation slope is too high:

→ activate monitoring of the polarisation slope in the function “activate”, then

→ set a polarisation slope value above which the transmitter generates a “warning” event and displays the icons and ⚠.

→ set a polarisation slope value above which the transmitter generates an “error” event and displays the icons and ERR.

When a “warning” or “error” event is generated by the transmitter:

→ go into the “Info” menu to read the cause of the event generation.

→ and/or go into the “Sensor” function of the Diagnostic menu to read the polarisation slope value.

→ if necessary, clean and/or recalibrate the conductivity sensor,

→ if necessary, check the process.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

- The "warning" event may also be associated with one or other or both transistor outputs. See chap. 9.11.10, function "Output.TR1" or "Output.TR2".
- The "error" event may also be associated with one or other or both current outputs. See chap. 9.11.9, function "Output.AC1" or "Output.AC2".
- See also "If you encounter problems" at chap. 10.3.

ACTIVATE: choose whether or not to activate monitoring of the polarisation slope.

POLARIZATION: read the current polarisation slope value.

WARN HI: enter the polarisation slope value above which a “warning” event is generated.

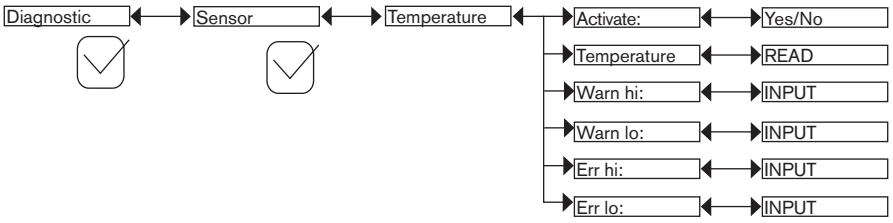
ERR HI: enter the polarisation slope value above which an “error” event is generated.

9.13.4. Monitoring the fluid temperature

See chap. 9.9 to access the Diagnostic menu.

A malfunction in your process or the built-in temperature probe may be shown either by too low or too high a fluid temperature or by an incorrect temperature measurement.

The function allows for monitoring the fluid temperature and configure the behaviour of the device if the parametered ranges are exceeded.



To be warned when the fluid temperature is too low or too high:

→ activate monitoring of the fluid temperature in the function “activate”, then

→ set a temperature range (in °C) outside of which the transmitter generates a “warning” event and displays the and ⚠ icons.

→ set a temperature range (in °C) outside of which the transmitter generates an “error” event and displays the and ERR icons.

When a “warning” or “error” event is generated by the transmitter:

→ go into the “Info” menu to read the cause of the event generation.

→ and/or go into the “Sensor” function of the Diagnostic menu to read the measured temperature value.

→ then check whether the built-in Pt1000 is working correctly by measuring a fluid with a known temperature. If the Pt1000 is faulty, return the device to Bürkert.

→ if the Pt1000 is not the cause of the problem, check the process.

- The "warning" event may also be associated with one or other or both transistor outputs. See chap. 9.11.10, function "Output.TR1" or "Output.TR2".
- The "error" event may also be associated with one or other or both current outputs. See chap. 9.11.9, function "Output.AC1" or "Output.AC2".
- See also "If you encounter problems" at chap. 10.3.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

ACTIVATE: choose whether or not to activate monitoring of the fluid temperature.

TEMPERATURE: read the fluid temperature measured in real time through the built-in Pt1000.

WARN HI: enter the fluid temperature value above which a “warning” event is generated.

WARN LO: enter the fluid temperature value below which a “warning” event is generated.

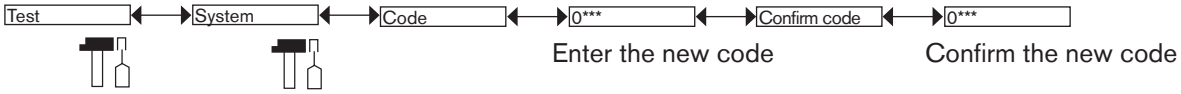
ERR HI: enter the fluid temperature value above which an “error” event is generated.

ERR LO: enter the fluid temperature value below which an „error“ event is generated.

9.14. Test menu

9.14.1. Modifying the Test menu access code

See chap. 9.9 to access the Test menu.

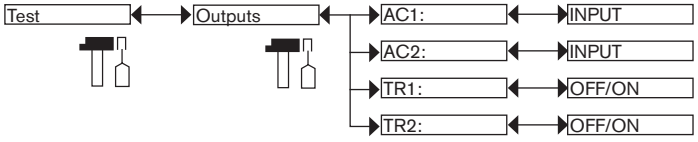


Default access code to the Test menu: 0000.

9.14.2. Checking the outputs functions

See chap. 9.9 to access the Test menu.

The T icon is displayed in place of the icon as soon as the check for the correct working of an output has started. During the check the related output does not react according to the measured physical value.



AC1: check that current output 1 is working correctly by entering a current value and then selecting “OK”.

AC2: check that current output 2 is working correctly by entering a current value and then selecting “OK”.

TR1: check that transistor output 1 is working correctly by selecting the status of the transistor (“ON” or “OFF”) then “OK”.

TR2: check that transistor output 2 is working correctly by selecting the status of the transistor (“ON” or “OFF”) then “OK”.

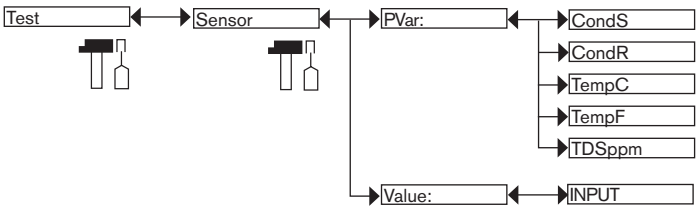
9.14.3. Checking the outputs behaviour

See chap. 9.9 to access the Test menu.

The T icon is displayed in place of the icon as soon as the check for the correct working of an output has started. During the check the related output does not react according to the measured physical value.

The feature allows for simulating the measurement of the process value to check if the outputs are correctly configured.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015



PVAR: choose the process value to be tested.

VALUE: enter a process value selected from the “PVAR” function above to check output behaviour.

9.15. Information menu

9.15.1. Reading the cause of events linked to icons

See chap. 9.9 to access the Info menu.

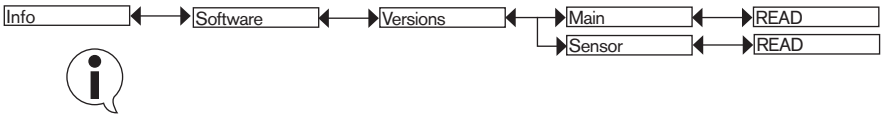
The function allows for reading a short description of the reason why the following icons are displayed by the transmitter:

- ERROR:
- WARNING: ⚠
- MAINTENANCE:
- SMILEY: or

See also "If you encounter problems" at chap. 10.3.

9.15.2. Reading the software versions

See chap. 9.9 to access the Info menu.



The function allows for reading the software version of the acquisition / conversion board (“Main”) for the process values and of the sensor board (“Sensor”).

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

10. MAINTENANCE AND TROUBLESHOOTING

10.1. Safety instructions

DANGER

Risk of injury due to high pressure in the installation.

- Stop the circulation of fluid, cut off the pressure and drain the pipe before loosening the process connections.

Risk of injury due to electrical voltage.

- Shut down and isolate the electrical power source before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to high fluid temperatures.

- Use safety gloves to handle the device.
- Stop the circulation of fluid and drain the pipe before loosening the process connections.

Risk of injury due to the nature of the fluid.

- Respect the regulations on accident prevention and safety relating to the use of aggressive fluids.

WARNING

Risk of injury due to non-conforming maintenance.

- Maintenance must only be carried out by qualified and skilled staff with the appropriate tools.
- Ensure that the restart of the installation is controlled after any interventions.

10.2. Cleaning of the transmitter

- Activate the HOLD mode (see chap. 9.12.1) and go into the Calibration menu in order not to interrupt the process during cleaning.
- Always use a cleaning product compatible with the materials from which the device is made.
- When cleaning the electrodes, ensure that you do not scratch their surface.
- Avoid dry storage of graphite electrodes during long interruptions in measurement in order not to increase the response time when they are next used.

Regularly clean the electrodes on the conductivity sensor with a suitable product, depending on how dirty they are.

Please feel free to contact your Bürkert supplier for any additional information.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

10.3. If you encounter problems

Red LED	Current output	Transistor output	Icon	Message displayed in the Info menu	Possible cause	Recommended action
ON	22 mA	depending on thresholds	ERR + ☺	"Sensor not found"	The connection to the measurement module is interrupted.	→ Switch the power supply off then on again. → if the error persists, return the device to Bürkert.
ON	22 mA	depending on thresholds	ERR + ☺	"S EE Fact Read"	Factory data is lost. The process continues but the accuracy of the device is modified.	→ Switch the power supply off then on again. → if the error persists, return the device to Bürkert.
				"S EE Fact Read"		
ON	22 mA	depending on thresholds	ERR + ☺	"S EE User Read"	User data for the sensor is lost.	→ Switch the power supply off then on again. → check the sensor parameters in all the "Sensor" menus then save them again. → if the error persists, return the device to Bürkert.
				"S EE User Write"		
ON	22 mA	depending on thresholds	ERR + ☺	"S PT Missing"	The connection to the Pt1000 probe is lost.	→ Check that the nut between the sensor holder and the electronic module is correctly screwed. → Send the device back to Bürkert
ON	22 mA	depending on thresholds	ERR + ☺	"S PT Regulation"	The fluid temperature is not being correctly measured. The process is stopped.	→ Switch the power supply off then on again. → if the error persists, return the device to Bürkert.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Red LED	Current output	Transistor output	Icon	Message displayed in the Info menu	Possible cause	Recommended action
ON	22 mA	depending on thresholds	ERR + ☺	"S RTC Clock"	The clock is faulty. The process continues.	→ Return the device to Bürkert if the clock is essential.
ON	22 mA	depending on thresholds	ERR + ☺	"TR EE Fact Read" "TR EE User Read"	Parameter reading error.	→ Switch the power supply off then on again. → if the error persists, set the device back to the default settings (chap. 9.11.4). → if the error persists, return the device to Bürkert.
ON	22 mA	depending on thresholds	ERR + ☺	"TR COM Measure"	The acquisition/conversion module of the process values is faulty. The process is stopped.	→ Switch the power supply off then on again. → if the error persists, return the device to Bürkert.
ON	22 mA	depending on thresholds	ERR + ☺	"TR EE UserWrite"	Parameter saving error.	→ Switch the power supply off then on again. → Save the settings again. → if the error persists, set the device back to the default settings (chap. 9.11.4). → if the error persists, return the device to Bürkert.
OFF	4-20 mA	depending on thresholds	⚠ + ☺	"S RTC Reinit"	The date and time are lost because the device has not been powered up for at least 5 days. The message is only displayed at the first powering up.	→ Set the date and time again (see chap. 9.11.2). → feed the transmitter for at least 4 hours so that the date and time are battery fed for 5 days.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Red LED	Current output	Transistor output	Icon	Message displayed in the Info menu	Possible cause	Recommended action
ON	22 mA [1]	depending on thresholds	ERR +	"E:Conductivity"	The fluid conductivity is out of range. The message is displayed if the monitoring of the fluid conductivity has been activated, depending on the set thresholds ERR LO and ERR HI (see chap. 9.13.2).	→ Go into the "Sensor" function of the Diagnostic menu to read the measured fluid temperature (chap. 9.13.2). → If necessary, clean and/or recalibrate the conductivity sensor,
ON	22 mA [1]	depending on thresholds	ERR +	"E:Polarization"	The polarisation slope is too high. The message is displayed if the monitoring of the polarisation slope has been activated, depending on the set threshold ERR HI (see chap. 9.13.3).	→ Go into the "Sensor" function of the Diagnostic menu to read the polarisation slope value (chap. 9.13.3). → If necessary, clean and/or recalibrate the conductivity sensor,
ON	22 mA [1]	depending on thresholds	ERR +	"E:Temperature"	The fluid temperature is out of range. The message is displayed if the monitoring of the fluid temperature has been activated, depending on the set thresholds ERR LO and ERR HI (see chap. 9.13.4).	→ Go into the "Sensor" function of the Diagnostic menu to read the measured fluid temperature (chap. 9.13.4). → If necessary, check whether the built-in Pt1000 is working correctly by measuring a fluid with a known temperature. → If the Pt1000 is faulty, return the device to Bürkert. → If the Pt1000 is not the cause of the problem, check the process.

[1] if the DIAGNOSMODE function of the “Output.AC1” or “Output.AC2” menu is set to “22 mA” (see chap. 9.11.9); else, the current output delivers a standard current between 4 and 20 mA

[2] If the “PVAR” function of the “Output.TR1” and/or “Output.TR2” menus is set to “warning” (see chap. 9.11.10); else, the transistor outputs are operating depending on the set thresholds.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

Red LED	Current output	Transistor output	Icon	Message displayed in the Info menu	Possible cause	Recommended action
OFF	4-20 mA	Switched [2]	⚠ +	"W:Conductivity"	The fluid conductivity is out of range. The message is displayed if the monitoring of the fluid conductivity has been activated, depending on the set thresholds WARN LO and WARN HI (see chap. 9.13.2).	→ Go into the "Sensor" function of the Diagnostic menu to read the measured fluid temperature (chap. 9.13.2). → If necessary, clean and/or recalibrate the conductivity sensor,
OFF	4-20 mA	Switched [2]	⚠ +	"W:Polarization"	The polarisation slope is too high. The message is displayed if the monitoring of the polarisation slope has been activated, depending on the set threshold WARN HI (see chap. 9.13.3).	→ Go into the "Sensor" function of the Diagnostic menu to read the polarisation slope value (chap. 9.13.3). → If necessary, clean and/or recalibrate the conductivity sensor.
OFF	4-20 mA	Switched [2]	⚠ +	"W:Temperature"	The fluid temperature is out of range. The message is displayed if the monitoring of the fluid temperature has been activated, depending on the set thresholds WARN LO and WARN HI (see chap. 9.13.4).	→ Go into the "Sensor" function of the Diagnostic menu to read the measured fluid temperature (chap. 9.13.4). → if necessary, check whether the built-in Pt1000 is working correctly by measuring a fluid with a known temperature. → If the Pt1000 is faulty, return the device to Bürkert. → if the Pt1000 is not the cause of the problem, check the process.
OFF	4-20 mA	Switched [2]		"M:Calib. Date"	A calibration of the conductivity sensor is due. The periodicity of the calibrations is set within the "INTERVAL" function of the "CALIB INTERVAL" menu (see chap. 9.12.4).	→ Calibrate the conductivity sensor (chap. 9.12.4).

[2]If the “PVAR” function of the “Output.TR1” and/or “Output.TR2” menus is set to “warning” (see chap.9.11.10); else, the transistor outputs are operating depending on the set thresholds.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

11. ACCESSORIES

ATTENTION

Risk of injury and/or damage caused by the use of unsuitable parts.

Incorrect accessories may cause injuries and damage the device and the surrounding area.

- Use only original accessories and original replacement parts from Bürkert.

Accessory	Order code
Display module	559168
Black blank cover with EPDM seal	560948
Transparent cover with EPDM seal	561843
Calibration solution, 300 ml, 5 µS	440015
Calibration solution, 300 ml, 15 µS	440016
Calibration solution, 300 ml, 100 µS	440017
Calibration solution, 300 ml, 706 µS	440018
Calibration solution, 300 ml, 1413 µS	440019
5-pin female M12 connector, to be wired	917116
5-pin female M12 female connector, moulded on shielded cable (2 m)	438680
5-pin male M12 connector, to be wired	560946
5-pin male M12 connector, moulded on shielded cable (2 m)	559177

12. PACKAGING, TRANSPORT

NOTE

Damage due to transport

Transport may damage an insufficiently protected device.

- Transport the device in shock-resistant packaging and away from humidity and dirt.
- Do not expose the device to temperatures that may exceed the admissible storage temperature range.
- Protect the electrical interfaces using protective plugs.

13. STORAGE

NOTE

Poor storage can damage the device.

- Store the device in a dry place away from dust.
- Storage temperature: -10 to +60 °C.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

14. DISPOSAL OF THE PRODUCT

→ Dispose of the device and its packaging in an environmentally-friendly way.

NOTE

Damage to the environment caused by products contaminated by fluids.

- Keep to the existing provisions on the subject of waste disposal and environmental protection.

Note:

Comply with the national and/or local regulations which concern the area of waste disposal.

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

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MAN 1000111235 EN Version: E Status: RL (released | freigegeben) printed: 19.01.2015

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